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H. D. FARGO, President and Treasurer
S. R. EDWARDS, Editor and Secretary

H. D. FARGO, Jr., Vice-President and Advertising Manager
D. C. SORENSEN, Western Advertising Manager

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"Telephony's" Annual Review of Industry

Telephone Station Growth for First Time in Recent Years Affected by Depression—Sales Activities of Companies Have Beneficial Influence—Important Court Rulings—Telephone Uses Expanded—Manufacturing Developments

By Stanley R. Edwards,
Editor of TELEPHONY

With approximately 500,000 salesmen and saleswomen talking telephone service constantly throughout the year, the telephone received the greatest publicity in 1930 that it has ever had. It does not require much imagination to picture what the effects of the prevailing business depression would have been on the telephone industry if, in 1930, the policy as to obtaining business had been the same as that prevalent three years ago or even less with some companies.

It is recalled that no business depression, since the telephone industry really commenced to expand, had any great adverse influence on the increase in the number of telephones. This year's depression substantially retarded the normal growth in telephones. But despite adverse conditions, there has been an increase in the number of telephones in the country.

The total number of stations as the year closes, is approximately 20,365,000, an increase of about 132,000 telephones during the year. This is a growth of approximately .65 of 1 per cent as against 4½ per cent, the average for the past five years. The total number of telephones installed in 1929 was slightly under 900,000. Of the 20,365,000 telephones in the country all but about 108,000 have connection with the toll lines of the Bell system. Approximately 5,000,000 of the country's telephones are of the dial type.

Undoubtedly, but for the continuous sales campaigns which were carried on by the companies during the year, the total number of telephones would have shown a loss. Some sections of the country showed an increase as high as 2 to 3 per cent, while in many large cities and industrial centers an actual loss in telephones was experienced.

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Construction work totaled slightly under the $700,000,000 estimated to be done at the beginning of the year. This had been increased over what had been projected following President Hoover's suggestion in November, 1929.

The regular construction program it is expected, will be continued in 1931, but the amount will probably total under $500,000,000. This, however, is practically the average of the yearly expenditure over the past five years. Lower prices of copper and other materials will permit of considerably more work for the expenditures this coming year.

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While the depression has been more severe and of longer duration than was anticipated, the general belief is that it has about run its course, and that the first half of the coming year will see business on the upgrade. It is confidently expected by many that the turn for the better will come sometime during the first quarter. Recovery of normal conditions, it is predicted, will be slow and gradual.

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On the whole the telephone industry, generally, may well congratulate itself upon the showing that has been made in this past year. While it has been affected by the general condition of business, it has not suffered to the large extent as has been experienced in other industries.

This, in part, may be ascribed to the spirit of cooperation that exists between the groups in the industry and the loyalty of employes to their business in endeavoring to promote its interests at all times.

The companies, in turn, have shown their appreciation of this loyalty by endeavoring to keep as many employes as possible at work. It is true that, in some cases, some employes have been laid off and others alternated with vacations. But telephone employes, generally, may be said to have been well taken care of by their employers.

The results of the cooperation of the

past few years between the two groups in the telephone field—the Independent and the Bell—were manifest in the past year in the excellent condition in which the industry finds itself at the present time.

Relation Between Groups.

In state and national affairs, the two groups have cooperated for the best interests of the industry. More and more each group is becoming better acquainted with the problems of the other group and the differences between them are being threshed out in conference.

The spirit that pervades was well expressed by former Vice-President E. K. Hall of the American Telephone & Telegraph Co., in these words: "When we do differ, whatever we do on our differences, let's do it inside of our industry. The Bell will undertake to do its share in our progress in the next 10 years. I predict in these 10 years a magnificent era of good faith in a united industry".

Mr. Hall offered this suggestion in an informal farewell talk at the conference of the Class A member companies of the United States Independent Telephone Association last July. In honor of Mr. Hall, a number of the presidents of the Bell companies attended the two-day conference of the executives of the larger Independent companies. As a result of this meeting of the high executives of both groups, a great deal better understanding now exists between them.

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One question of importance before the groups relates to the toll business and the compensation which the connecting companies should have. Another question relates to the proposed sale of the St. Paul properties of the Tri-State Telephone & Telegraph Co. Both questions involve a number of problems that cannot be quickly settled.

The latter question, in the minds of many Independents, involves a policy of relinquishment of an equivalent number of telephones by the Bell company whenever a purchase of Independent property is made by it. It is argued that without a definite policy of relinquishment, the Independent group cannot be held intact.

The toll situation is a complicated one because of the different phases involved. A study of toll conditions in Ohio has been made under the auspices of the Ohio Independent Telephone Association. It is expected that it will yield information which may be used as a foundation for the settlement of the toll compensation question in a fair and equitable manner to all.

It may be stated that the leaders in both groups are giving grave consideration to these questions with an earnest desire to solve them in a manner that will be for the best interests of the industry.

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There have been a number of purchases of Independent properties by Bell companies, outside of Pennsylvania where the purchases have been made to clear up duplication of property. These purchases have been, generally, of small plants located in what might be termed "Bell territory."

In connection with the clearing up of duplications of exchanges in Pennsylvania, there was a division of territory between the Cumberland Valley Telephone Co., Harrisburg, and the Bell Telephone Co. of Pennsylvania.

Under an agreement approved by the Pennsylvania Public Service Commission and the Interstate Commerce Commission, the Cumberland Valley company retired from certain territory and the Bell company from other territory. The Bell company yielded to the Cumberland Valley company 8,397 telephones while the Cumberland Valley company gave up to the Bell 4,959 stations.

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During the year, the Bell company purchased 23,749 Independent telephones while the Independent companies acquired by purchase from the Bell company 8,875 telephones.

Of these 5,111 were taken over by the Bell companies in connection with the clearing up of competitive situations and 8,451 were given up to the Independents. These figures relate to purchases and sales approved by the Interstate Commerce Commission during the year.

U. S. Supreme Court Rulings.

The United States Supreme Court issued two rulings that were of great interest.

On January 6, in a decision rendered in the Baltimore street railway case, this court is said to have placed itself on record for the first time as to the method to be followed in computing depreciation. The decision was rendered in the case of the United Railway & Electric Co. of Baltimore on an appeal from the Maryland Court of Appeals and arose from an order of the Maryland Public Service Commission limiting the rate of passenger fares to be charged in the city of Baltimore.

"The allowance for the annual depreciation made by the commission," said the Supreme Court, "was based upon cost. The court of appeals held that this was erroneous and that it should have been based upon present value. The court's view of the matter was plainly right. . . . It is the settled rule of this court that the rate base is present value, and it would be wholly illogical to adopt a different rule for depreciation."

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The other ruling of the U. S. Supreme Court has been classed by John E. Benton, attorney for the National Association of Railroad & Utility Commissioners, as almost as important as regards telephone rates as the Minnesota rate cases opinion was to railroad rates. This opinion, written by Chief Justice Hughes, was handed down on December 1 in a case concerning rates for four-party coin-box service of the Illinois Bell Telephone Co. in Chicago.

The decision emphasizes the facts that the intrastate business must pay its own way; that its rates must be fixed without regard to the profitableness of interstate business; that it may not be burdened by any improper cost resulting from intercompany transactions; and that such transactions may be closely scrutinized.

The right of the state authorities to full information with relation to these intercompany transactions can no longer be questioned, Mr. Benton declares. The respective duties of regulators and utilities are thus left clear.

The decision has been published and commented upon so recently in TELEPHONY that further reference is unnecessary.

Already, as a result of this decision of the United States Supreme Court, steps have been taken in two rate cases ruled upon last month by federal courts, to reopen them for receiving further testimony along the lines indicated in the decision.

Another case which is before the U. S. Supreme Court and probably will be ruled on during the coming year is an appeal of the New York Telephone Co. from an order of the United States District Court issued in the latter part of 1929.

Charges on Hotel Room Calls.

In the course of the year there was some agitation relative to charges made by hotels on telephone calls from rooms. In large cities, calls may be made from pay stations in hotels generally for five

cents a call, but if made from a room in the hotel, a charge of 10 cents is assessed.

In Milwaukee, Wis., the Pfister Hotel commenced charging guests 10 cents for telephone calls made from rooms. The Wisconsin Telephone Co. served notice on the hotel that if this practice was not stopped, service to the hotel would be discontinued, as the rate authorized by the Wisconsin Railroad Commission was five cents per call.

The hotel obtained a temporary injunction against the telephone company restraining it from discontinuing service. In April, the court upheld the telephone company, declaring for the five-cent rate, and then the hotel appealed to the state supreme court.

This month, the supreme court held that the hotel must not charge more than the five cents per call. It also upheld an order of the Wisconsin Railroad Commission in December, 1910, which declared that a telephone in a room of a hotel is an extension of the telephone company's service and calls must be charged for at the rate which the telephone company is authorized to charge.

This order of the Wisconsin commission in 1910 brings up the same points as brought out in an order of the Pennsylvania commission in November of this year, forbidding the resale of telephone service by office buildings.

"The reasons for these restrictions on extensions and listings," the Pennsylvania commission stated, "are to prevent the introduction of a middle man in the business of the respondent, it being contended that in the telephone business a middle man is not a necessity or even a convenience, and that without a middle man, the respondent can control its service and the charges therefor, and this commission can control the respondent."

The Wisconsin Supreme Court ruled that the hotel could charge for calls made between rooms in the hotel.

Poles on Highways.

In Iowa, the matter of poles along the highways has been clarified by a decision of the state supreme court made on June 26. It was pointed out that the legislature has authorized electric lines to be on the highways and that the county engineer has the power to specify the location of the lines upon the highways.

The lines, however, must be so located on the highway that not only the poles but all of the wires, guys, superstructure, etc., shall be within the confines of the highwas; that is, crossarms cannot overhang the adjoining property.

Subscriber Responsible for Charges.

The Arkansas Supreme Court, in a case involving payment of charges for toll calls from a station, upheld the telephone company's rule that such calls shall be charged to the telephone from which they originate.

In this particular case, a sheriff refused to pay for long distance calls made from the telephones installed in his office and in the county jail, claiming that the bill should be paid by the county which was the subscriber for the telephones. The calls were made in the administration of his duties as sheriff of the county. The circuit court found the issues in favor of the sheriff and against the county.

The opinion of the state supreme court quoted a former decision of the Arkansas Supreme Court that "It was a reasonable rule for a telephone company to require that the telephone, where long distance calls originate, shall be responsible for the payment of charges therefor and that the company has a right to enforce such rule.

"The reason is that the subscriber can easily control the use of his telephone by third persons, while it is impossible for the telephone operators to know and recognize the voices of all persons using a telephone for long distance purposes, and to know to whom these calls should be charged in the absence of such a rule."

Declaring that public officers "have just as much control over their telephones and the accessories to their offices as do private individuals or private corporations," the court held that the county, as a subscriber of the telephone, is bound by the regulations of the company in its use just as other subscribers are bound.

Radio Anti-Trust Suit.

Of general interest to the telephone field was the suit entered by the U. S. Department of Justice against the Radio Corp. of America for violation of the anti-trust laws. The suit was filed in the federal district court at Wilmington, Del., on May 13 and is concerned chiefly with the legality of patent arrangements made between the Radio Corp. of America, the General Electric Co., the Westinghouse Electric & Mfg. Co., the American Telephone & Telegraph Co., the Western Electric Co., and five other corporations.

These arrangements, it is alleged, have resulted in placing the control of the radio business and its developments in the hands of the defendants named. In general the government seeks a decree perpetually to enjoin and restrain the defendants "from continuing to carry out, directly or indirectly, expressly or impliedly, the said combination and conspiracy, from monopolization or attempting to monopolize, and from entering into or carrying out directly or indirectly any similar combination and conspiracy and monopolization of interstate trade or commerce."

Federal Communications Commission.

The so-called Couzens bill was carefully watched by the United States Independent Telephone Association during the year. Hearings on it took place before the senate interstate commerce committee during the winter and spring.

At these hearings a number of Independent telephone men appeared and gave their views as did also W. S. Gifford, president of the American Telephone & Telegraph Co. Various officials of the telegraph and radio companies also gave testimony before the committee. Much interesting information was developed concerning the future trend of communications from a world standpoint. The theory was advanced that telephone, telegraph and radio outside of the United States should be combined into one company. The greatest efficiency and development would result from such organization, it was said.

The Couzens bill proposes to place the telegraph, telephone and radio all under the regulation of one federal commission.

In their testimony before the senate committee, the Independent telephone men argued against being placed at this time under the same regulatory body as the radio industry because the radio industry is not as yet stabilized. They contended that the regulation provided by the Interstate Commerce Commission, in addition to that exercised by the various state commissions, is satisfactory and in the best interests of the public and the companies.

No action was taken by the senate committee on the bill and it is not thought congress will enact legislation providing for a federal communications commission at this session.

Rate Cases.

Several cases involving rates of Bell companies were continued in 1930 from preceding years, and this year closes with them not definitely settled.

The New York case previously referred to as being in the United States Supreme Court was again before the New York commission. The federal statutory court, in November, 1929, authorized the New York company to increase its rates so as to earn an average of 7 per cent on its investment capital. In late January, the company filed a schedule of rates to become effective February 1, which it stated would permit of the 7 per cent return.

On January 31, the New York commission issued a temporary order adopting the company's schedule but directing a 20 per cent reduction in every increase over the old figures. On May 1 after two weeks of hearings, the commission issued an order reducing the valuation of the telephone company, denying the rate increase it had sought and cutting the temporary schedule which had been in effect since February 1.

While this case was proceeding before the state commission, the New York company appealed to the United States Supreme Court from the decision of the federal statutory court. It aimed particularly to secure a restoration to the official valuation of its property, of $71,000,000 which it claimed the district court erroneously deducted for depreciation; and it also sought an 8 per cent return on its property instead of the 7 per cent allowed it by the district court.

The rates specified in the commission order of May 1, under which the New York company is now operating, are to remain effective until June 1, 1931, or until further order of the commission.

The income of the New York Telephone Co. was still further reduced by an order of the New York Public Service Commission issued October 23, approving a revised schedule of charges for toll calls beyond a distance of 40 miles within the state. The order of the commission brings the toll charges of the New York company in strict conformity with those of the American Telephone & Telegraph Co. which the commission accepted as a guide.

Complaints had been made to the New York commission that charges on intrastate calls were considerably more than on interstate calls for corresponding distances. That body cited the New York company to appear before it to show cause why the rates should not correspond to those of the American company for similar distances. The filing of the modified schedule by the New York company resulted and it was accepted by the commission in the order mentioned.

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In Michigan, the report of the master in chancery to the statutory court was made on January 21. His report recommended that an order be entered by the district court at Detroit permanently restraining the Michigan Public Utilities Commission from compelling the Michigan Bell Telephone Co. to observe the rates prescribed by the commission in 1926.

The three-judge statutory court, on November 25, ordered that a decree be entered declaring the commission's order invalid and enjoining the enforcement of the reduced rates. Entering of the decree was ordered deferred, however, for 30 days pending an appeal. The recommendations of the master were practically all sustained by the court. Arguments were heard by the court on December 13 to the effect that the recent decision of the United States Supreme Court in the Chicago coin box rate case gave grounds for taking new testimony in the case. The court directed the master in chancery to again take testimony.

The Michigan commission, upon the suggestion of Attorney General Brucker, who is now the governor-elect of the state, had held a hearing prior to the court's decision and is considering an investigation of the company with a view to rate adjustments.

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Hearings on the state-wide rate case of the Ohio Bell Telephone Co. which were commenced in 1926, were held during the early part of the year. The case was finally submitted to the commission in April and up to the present time no ruling has been made.

Since the case started, the public state utilities law has been changed and a new commission heard the testimony at the hearings this year.

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The rate case of the Southwestern Bell Telephone Co., in San Antonio, Texas, was ruled upon by the federal court in late November.

The master's report was filed on March 4 and found for the telephone company. The master's findings were approved by Judge Edwin R. Holmes of the federal district court of Mississippi, who ordered that a decree be entered in accordance with them.

Judge Holmes, after reading the recent decision of the U. S. Supreme Court in the Chicago case, wrote the city attorney's office in San Antonio that the case should be referred back to the master for further consideration and findings.

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The Independent companies, as a rule, have secured slight increases where they were justified. There are still a number of situations where the rates in Independent exchanges are below those of comparable neighboring Bell exchanges.

In Ohio, where a new commission operated under an amended public utility law, the cases decided were quite generally against the companies.

In Indiana, the commission authorized increases at Terre Haute and at La Porte. Both cases were appealed by the cities to the courts. In the La Porte case the commission's order was set aside. An appeal was then made by the company to the state supreme court. No decision has been rendered in the Terre Haute case.

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Because of drought conditions, the Indiana commission deferred action on several cases involving rate increase applications. On one of these, application was made to the federal court for an injunction. After the commission issued an order refusing the increase, the federal court denied a temporary injunction. Some hearings in the case—that of the Southern Indiana Telephone & Telegraph Co.—were held this month on the application for a permanent injunction and have been continued to next month.

Receiverships Follow Speculations.

The after effects of the activities of promoters in buying up telephone properties were seen in the receiverships for two systems in early fall. In both instances, inflated prices had been paid for the telephone properties and the subsequent financial structure upon which their operation was based was unsound. Just what will result from the operation of these properties by a receiver is undetermined at the present time.

One of the receiverships involves a great many small plants. Whether or not a plan can be evolved for simplifying the financial structure so that the various properties can be separated so as to be disposed of under plans which will permit of their being operated economically, is a question.

Publicity and Public Relations.

As previously mentioned, the telephone received greater publicity in 1930 than in any previous year. This was due to the policy of sales campaigns inaugurated during the past two or three years and intensively promoted this year.

Under the plan of "every employe a salesman," employes talked more of the telephone business and advantages of the telephone to a greater number of people than ever before. In many parts of the country there was not a home or office, manufacturing establishment, or other possible location for a telephone, the occupant of which was not solicited by some telephone man or woman.

In addition to this, probably every telephone subscriber was asked if his telephone service was satisfactory and an attempt was made to sell additional facilities. Many employes, when opportunity offered, spoke of the advantages of the use of long distance service.

Not only was business developed for the telephone companies through this great army of telephone men and women, but public relations also benefited. As a result of these personal contacts, the public is thinking more and more of telephone companies in a personal manner.

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Another activity, which has contributed toward a better understanding between the companies and the public, has been the addresses and demonstrations before thousands of people in all parts of the country by Sergius P. Grace, of the Bell Telephone Laboratories.

The talk and demonstration which Mr. Grace gave before the national convention in Chicago three years ago started him on a round of telephone conventions, followed by the presentation of telephone development and research work before engineering organizations and gradually to business men's and civic organizations. The people thus reached are those who comprise the most desirable element in the many places in different sections of the country where Mr. Grace has appeared.

The value of a better understanding of what the telephone company is doing in developing the highest grade of service possible cannot be estimated in a money sense, but these addresses and demonstrations are undoubtedly the most effective method of promoting public relations in a national way that the Bell system has developed.

Along the line of personalized service, the Bell companies are gradually returning to former practices of furnishing such services as time of day and other personal services, that were rendered free, particularly in the small communities. This service, however, is not being furnished in the larger cities free. Special arrangements have to be made to handle it, so that a charge is made for the service.

In some exchanges in the East, a "Call Me" service has been inagurated. The company has arranged for calling patrons at a certain hour in the morning, to remind of an appointment, or in time to catch a train. These are indications of the careful scrutiny which telephone companies are giving all avenues for development of additional revenues, or by-products of the industry.

Service in Rural Territory.

The service furnished in rural communities has been improved to a considerable extent during the year. In some of the states, particularly those west of the Mississippi River, the grounded line system is used to a large extent.

The introduction of high tension power lines in the rural territory is increasing the difficulties of satisfactory operation of the grounded line system, and these are gradually giving way to metallic circuits.

The regulatory commissions in the various states recognize the greater cost of metallic line service and are granting applications for higher rates for this class of service. The telephone companies, on the other hand, are educating their subscribers to the value of improved service. In a number of cases magneto service has been replaced by common battery service, after the subscribers had explained to them the type of service that they would have and had given consent to higher rates.

As a result of the agitation in the past two years relative to service supplied in farming districts, the subscribers are becoming educated as to the components of good service and its importance to them. Through this program of education, it is expected that the rural service will be brought up to approved standards as the general farm situation improves.

State Associations' Activities.

State associations justified their existence in many ways. The year has been one of many activities for more of the state organizations than usual.

The annual conventions and district meetings were unusually well attended and the programs were designed to suggest ways and means of meeting present conditions.

In letters and bulletins to member companies, much information and many suggestions were given relative to business development, plant operation and maintenance. The scope of the services of several of the associations was extended so as to take care of practically any matter upon which a company might desire information and advice.

Distinct progress was made in 1930 in improving the character of the service rendered by the different state organizations and plans are being made for greater service in the coming year.

Bell Personnel Changes.

In no one year have there been as many changes in the operating personnel of the Bell companies as in the year just closing. This was due to a rule which became effective July 1, providing for the compulsory retirement of employes who had reached the age of 65 years or more.

As the 65-year age limit applies to all employes, regardless of positions, there were many retirements from the higher offices, and this resulted in promotions of younger men who, through years of service, have demonstrated their capability for greater responsibilities.

Owing to the pension plan, this retirement rule of the Bell system in general does not inflict a great hardship upon those obliged to retire, and it does provide greater opportunity for advancement for others.

Telephone Increases Police Efficiency.

The use of the telephone by police authorities for the apprehension of criminals was greatly extended during the year. There were several state-wide installations of telephone typewriter service for state police and also for county and municipal police, whereby reports of crimes and descriptions of criminals can be quickly given over a wide area.

In some of the larger cities, police radio broadcasting systems were installed. These in connection with the wire telephone and telephone typewriter systems, are greatly increasing the efficiency of the police in the catching of criminals.

Ship-to-Shore Service.

During the year the ship-to-shore telephone service, which was inaugurated about a year ago to one ocean liner, was extended to several other ocean liners.

Regular communication is now to be had with four of the liners, operating between the United States and Europe. Arrangements have also been made so that similar telephone connections to the ships are maintained with Europe through short-wave radio telephone stations in England.

Communication with Trains.

In April, the Canadian National Railways inaugurated regular telephone service to moving trains between Montreal and Canada, a distance of about 335 miles.

The train telephone is a combination of telephone and radio broadcast. The voice of the passenger on the train is broadcast from the antennae of the telephone car to the carrier current telegraph wires which parallel the track. Once on these wires, it is transferred to a pick-up station, relayed to the exchange of the Bell Telephone Co. of Canada at Kingston, Ont., from which it is connected with any point having connections with lines of the Bell system.

The total number of calls during the first five months of operation of the system was 791. As high as 31 calls on a single trip of a train have been handled. About 65 per cent of the volume are now business conversations, about 25 per cent social calls, and about 10 curiosity messages.

Manufacturing Developments.

The manufacturers of telephone equipment brought out a number of new developments during the year. These were in the shape of new types of handsets for desk and wall set use, switchboard improvements, protector and other apparatus.

Among the important developments of 1930 was the introduction of a new small exchange common battery switchboard. It was first shown at the national convention in October. This switchboard—known as Monotype Community—is designed to permit the operating manager of the smaller telephone company to place his exchange on a common battery basis easily and economically without the least possible disturbance to his operating quarters or to the operating staff.

Many new technical features are incorporated in the design, the most important of which is the combined switchboard frame and relay rack. Not only does this unusual departure from previous designs reduce the labor required in inspection and maintenance, but it also lends itself to manufacture on a quantity production basis, and consequently reduces the first cost. It will be interesting to see how this modern manufacturing method can be applied to the problems of telephony.

The switchboard has created much comment, and many telephone men have expressed their enthusiasm, both as to the design and its application to the financial limitations of the small exchange.

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Another manufacturer brought out a new lamp line magneto switchboard, which was exhibited at the Illinois and Missouri conventions.

The principal advantage claimed for this new magneto switchboard include: More positive line signal, more positive cord circuit clear-cut, common battery type of operator's circuit with constant high transmission efficiency.

Two types of line circuits are incorporated in the board: one for short city lines which are primarily for single-party service, and the other for heavily-loaded rural service designed to indicate code signaling.

At the conventions where exhibited, the board attracted unusual attention and was highly praised by plant superintendents and traffic executives.

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The manufacturers of dial telephone equipment devoted a great deal of time and effort to the work of standardization of design and mounting arrangements for the switching equipment used in small dial exchanges. The outcome of these studies has been most satisfactory. The present "sectional type" design, which involves the assembly of standard shelves or sections of switches, has been welcomed by operating engineers in all parts of the world

These improvements in design have led to the rather more extended use of automatic units for small exchange operation, and this in turn has given considerable impetus to the development of through toll dialing in networks involving switching between small exchanges.

Development workers in dial telephony have also contributed a number of devices which permit increased revenue for the telephone company through the use of existing automatic plant. One of these—automatic time service—offers a method for dial subscribers to ascertain the correct time by merely dialing a predetermined code, the time being given over the wires by means of suitably tuned gongs.

Another development, which promises to be of considerable usefulness, is messenger call service. In this the lines of the telephone are used in place of the lines of a telegraph company for the calling of messengers, i. e., a telegraph messenger may be called over a regular subscriber's telephone line merely by dialing a predetermined code, the number of the calling subscriber being recorded automatically at the office of the telegraph company.

The Bell system companies placed in use a new dial P. B. X. to meet the need for more extensive telephone equipment for residences. It is in two sizes—with 15 station lines and three office trunk lines, and 8 lines and two trunks, respectively. The equipment is arranged to give three paths for intercommunicating connections for the larger size and two for the small.

The apparatus is arranged to allow answering central office calls at various locations. By means of a five-button key, any station may place or answer either central office or local calls, and transfer central office calls to other stations. A considerable number of these miniature private branch exchanges have been installed by the Bell companies, not only in residences but also for small business concerns.

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A handset desk telephone entirely different in appearance from any on the market was brought out. It is of streamline design with a low center of gravity. The handle, of solid Kellite, contains two heavy brass bars. These serve as conductors for receiver and transmitter and act as reinforcement to the handle. The entire switch-assembly is fastened in the Kellite base by two screws.

Television Development.

Television is still in the laboratories but progress has been made with it.

In April a demonstration was given in New York City of two-way television. In this, the speakers at both ends of a telephone line or radio circuit see the images of each other as they talk. Telephone wires were used in the demonstration, but it was pointed out that the system is applicable to radio, although with less certainty than when wires link the two points.

Attention is called to the fact that the 1930 television image is greatly improved over that shown by the Bell Telephone Laboratories in 1927 and is double the size with more clarity and detail. The radio "eyes" are much more sensitive. They create ten times the amount of current for the same amount of light as did those of

three years ago. The dazzle of the light has been eliminated by the increased sensitivity of the "eyes" and by a blue scanning screen.

Because of its present complexity and high cost, the commercial possibilities of television are still uncertain. The technical problems have been practically all solved but commercial television it is believed will not be a fact for some time to come.

Long Distance Plant.

Long distance service continued to expand during the year. Despite the business conditions, the use of long distance service by the public did not show a falling off to an alarming extent.

Continuing on the work laid out under its five-year program of extensions, the various Bell companies installed a good many miles of cable, all of which will be used in connection with the toll network of the country. The cable insures that service will not be interrupted during storms as has been the case with open wires.

The conduit for the underground cable across the state of Missouri between St. Louis and Kansas City was completed the middle of the year and the work of drawing in, connecting up and testing the cable is almost finished.

In September, a cable connecting San Francisco and Los Angeles was opened for service after some two years of difficult engineering and construction work. The cable is 415 miles in length, of which more than 270 miles are underground. Eventually, this cable will be one of the main links in the Canada-to-Mexico cable of the Pacific Telephone & Telegraph Co., which is scheduled for completion within the next few years.

In Michigan, about 155 miles of cable were added to the trans-Michigan long distance cable system, the building of which began in 1921. Four sections, totaling 101 miles, were completed this year and another section of 54 miles from Grand Rapids to Big Rapids is expected to be completed and in service by May next.

In Ohio, work was pushed on the cable project between Wheeling, W. Va., and Terre Haute, Ind. This is the second cable between these points, a distance of 392 miles. It is expected to be ready for service by October 1 of next year. An additional cable between Richmond and Wheeling is also being constructed to connect with cable facilities to the East.

In other states, similar progress was made in placing the open toll wires in cable and rendering the service less subject to interruption by the elemtns.

Extension of Overseas Service.

During the year, announcement was made by the American Telephone & Telegraph Co. of its intention to extend telephone service to Pacific Ocean points. Sites for radio stations have been purchased in California and construction will be commenced early next year.

Service between the United States and Hawaii is scheduled to start in January 1932, as the first step in connecting the telephone network of the United States with Far Eastern countries in or on the Pacific. The establishment of services to Japan, Australia, Philippines and Alaska and also to ships at sea, is contemplated for the future.

Plans were also announced by the Bell company for short-wave radio telephone service between the United States and the Bermuda Islands, a distance of approximately 800 miles from New York City. Messages passing over the Bermuda radio circuit will follow the same wire paths as those used for other oversea calls. The transmitting stations will be located at Lawrenceville, N. J., and the receiving station at Netcong, N. J.

Service between the United States and South America was opened in April and that between the United States and Australia commenced in October. The service to Australia is by way of the transatlantic radio to England and thence to Australia. The England to Australia service was opened on April 30 and after a number of months of operation, the link to the United States was added.

As a result of the extension of telephone service from the United States to South America and Australia, five continents are now connected telephonically, and 89 per cent of the world's telephones on the continents of North America, South America, Europe, Africa, and Australia have access to this service.

Transatlantic Telephone Cable.

The actual laying of the world's first transatlantic telephone cable will not take place until the summer of 1932, it has been stated. The cable when laid will extend from the eastern coast of Newfoundland to the western coast of Ireland, a distance of 1,800 nautical miles.

Right of way is being purchased and cleared on this side of the Atlantic and already poles are being set and some wire has been placed for the lead of about 860 miles from the Maine-New Brunswick border to the final terminal in the vicinity of Trinity Bay, Newfoundland.

From Calais, Me., the new line runs to St. Johns, N. B., and thence to New Glasgow, N. S., and on to Sidney Mines. From Sidney Mines to Port au Basque underwater cable will be laid and probably continued to Grand Banks, Newfoundland. The final link between Grand Banks to the cable terminus will be traversed for the most part by underwater cable.

Outside United States.

Telephone conditions throughout the world generally were disturbed by the business depression, which is world-wide, and also by unsettled political conditions in a number of countries. Despite this, construction work and improvements were made in many countries.

In Canada it is expected that an all-Canada transcontinental line will be in operation by the fall of 1931 or the spring of 1932. A number of the sections of this line have already been completed and the gaps will be closed up during the next six months or so. It is being built through the cooperation of government-owned and private systems.

In Europe, a number of new sections were added to the toll telephone cable network, greatly improving the services between and within the different countries. The most notable cable was the world's largest submarine cable, laid between Stralsund, Pomerania, Prussia, and Malmo, Sweden. It is 75 miles long and contains 85 circuits.

In various parts of Europe, efforts were made to improve the local service and secure more subscribers. The Swiss Telephone Development Association was active in getting out literature for the education of the public to the advantages of telephone service.

In England the British Telephone Development Association continued its good work of former years. The increase in telephones was quite satisfactory.

There has been some agitation in England that operation of telephones should be placed in a position of relative independence and run on commercial lines.

Basic plans for transferring telephones and telegraphs to private management are reported to have been drafted by the Japanese Ministry of Communications.

Practicability of the Radiotelephone

Experiments of British Columbia Telephone Co. in Western Canada Regarding Providing Long Distance Radiotelephone Service to Points in its Territory Telephonically Isolated—Experiments Show Service Practicable Along Coast

By C. H. McLean,

Transmission Engineer, British Columbia Telephone Co., Vancouver, B. C., Can.

Radiotelephone experiments are now underway in British Columbia, Canada's far-west province, with the object of providing long distance telephone service for points in the province heretofore telephonically isolated.

Already, through the conjunction of radio with land lines of the British Columbia Telephone Co., such a service has been given the thriving paper mill town of Powell River, located on the British Columbia mainland, about 100 miles north of Vancouver; and a recent cruise to northern coast points in a ship equipped with radiotelephone sending and receiving apparatus demonstrated that a service of this kind for such places as Ocean Falls and Prince Rupert is practicable.

The Campbell River Transmitter, Dynamotor and Starter.

Less than two years ago, the management of the B. C. Telephone Co. agreed that the extension of long distance service to northern coast points would necessarily have to be by other means than physical plant because of the very rugged nature of the British Columbia shore-line. The use of radiotelephony was proposed. Following the success of tests with a trial installation over a water distance of approximately 30 miles, it was decided to conduct further experiments to determine the feasibility of radiotelephone service.

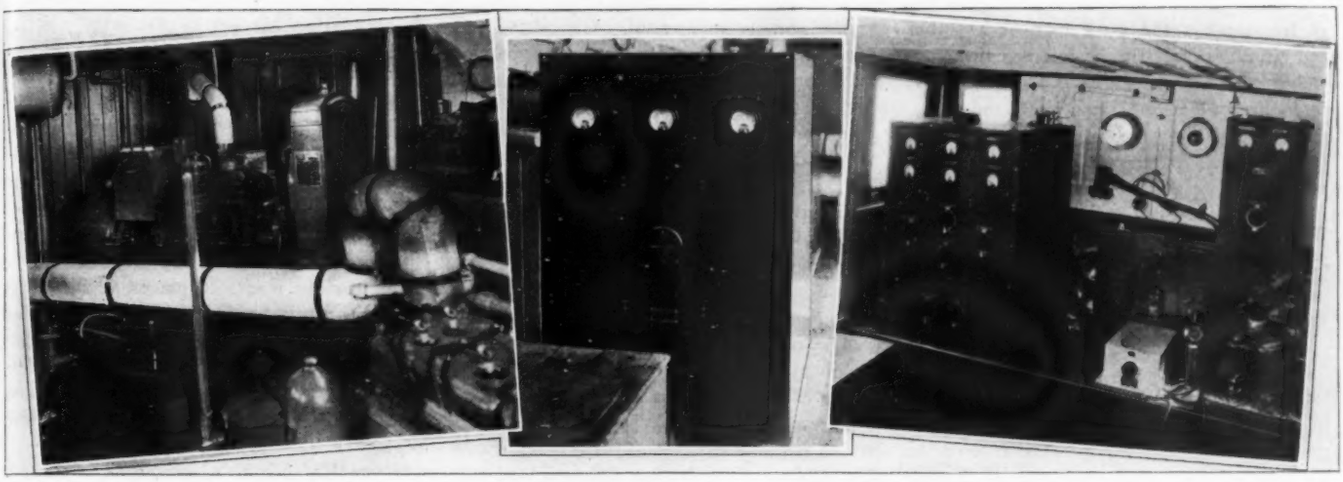
The Northern Electric Co., of Canada, was selected to build two sets of equipment. The recent developments of crystal control of frequency and improved modulation were features incorporated in the transmitters by the manufacturers. An experimental location was chosen at Campbell River, on Vaucouver Island, which is the northern extremity of the B. C. Telephone Co.'s physical plant. The paper manufacturing town of Powell River, on the mainland, about 45 miles from Campbell River, was chosen for an experimental station, to work with Campbell River. Powell River has a population of nearly 5,000 people, and was completely isolated, from the standpoint of roads and telephone service.

The necessary equipment for the two locations was received during the latter part of 1929. Following a three-month experimental period, the link was opened for public service as a Powell River-Campbell River radio circuit, connection being made at Campbell River with the B. C. Telephone Co.'s physical lines. The service is well patronized and calls have been completed to such distant points as Montreal and Los Angeles.

C. H. McLean, Transmission Engineer of the British Columbia Telephone Co., Who Has Had Charge of the Radiotelephone Experimental Work.

The transmitters used at Campbell River and Powell River consist primarily of a temperature-controlled quartz crystal oscillator, working at half the transmitted frequency; a frequency doubler; a modulator; a power amplifier; and an audio frequency amplifier. This equipment, associated with a power control unit and the necessary test meters, is mounted in three panels. The equipment is arranged to cover frequencies between 2,000 and 4,000 kilocycles (wave length, 150 to 75 meters), and by a slight rearrangement can cover frequencies much higher. An electric oscillator is incorporated in the sets for convenience of operation where it is desired to

One of the Pioneer Radiotelephone Calls in Progress. H. C. Nunan, in Center, Manager of the New England Fish Co., Ketchikan, Alaska, Conversing with Vancouver from the Pilot House of the Belmont at Ketchikan. At Right Are C. H. McLean, Transmission Engineer, and G. Valentine, of His Department. At Left Is H. A. Robinson, Radio Engineer of the Northern Electric Co.



The Belmont's Equipment. At the Left Is the Five-Kilowatt, Gaso line-Driven Generator for Radio Power Supply, with the Boat Engine in the Foreground. In the Center Is the 2-A Rectifier, Supplying Direct Current for Plate and Grid Circuits of the Transmitter. At the Right Is Shown the Interior of the Pilot House: Left to Right Is Seen the 9-A Radio Transmitter, the 9-B Radio Receiver and Associated Control Equipment, and the Antenna Tuning Unit.

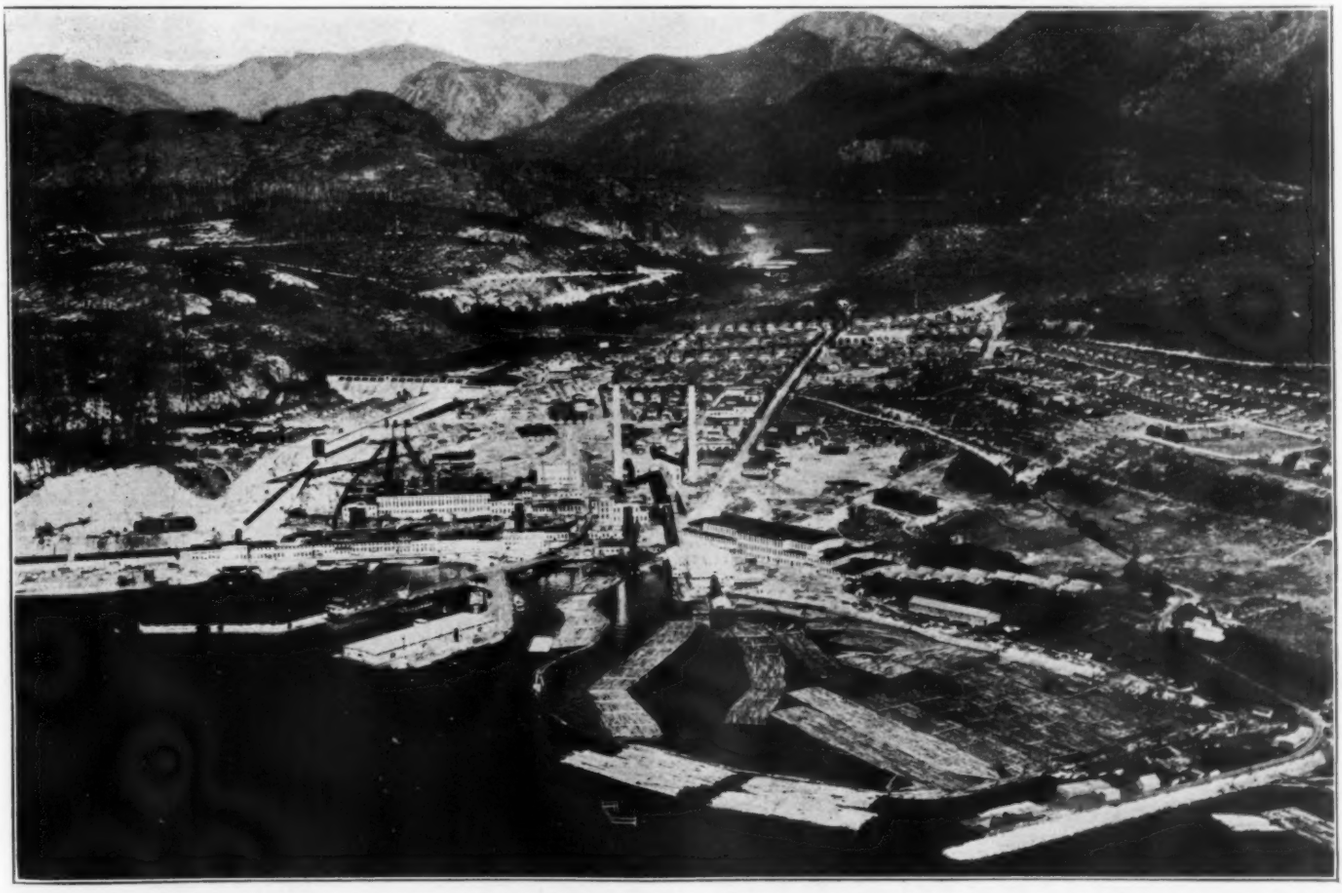
select temporarily a frequency differing from the crystal.

Five-watt vacuum tubes are employed in the oscillator, frequency doubler and audio amplifier, while two 50-watt tubes in push-pull are used in the modulator, and a single 50-watt tube in the power amplifier. The 50-watt tubes are of the tungsten filament type, thus allowing the immediate application of the plate voltage at practically the same time as the filament circuit is energized.

In the case of Powell River, a motor operated from commercial power drives two generators, which supply 14-volt filament current, and a 1,200-volt plate current.

At Campbell River, commercial electric powe: is not available, necessitating the use of a gasoline engine and battery installation. Tube filament supply is taken direct from the 32-volt battery, while a dynamotor operated from the battery produces the 1,200-volt high tension current. The unmodulated carrier is rated at 50 watts, and the particular features are stability of frequency and high modulation without quality impairment.

Campbell River transmits on a frequency of 2,212 kilocycles, with Powell River transmitting on 3,016 kilocycles. The transmitter at Campbell River is located in the telephone office, and is arranged for automatic operation; that is, the operator, desiring to call Powell River, plugs into the toll line jack which is located on her



An Aerial View of Powell River, B. C., Can., Which Was Completely Isolated from Standpoint of Roads and Telephone Communication with the Outside World. By Means of a Radio Link This Town of 5,000 People Is Able to Talk to Vancouver, and Calls Have Been Made to Such Distant Points as Montreal and Los Angeles.

switchboard in the same manner as other toll circuit jacks. By insertion of the plug-ended cord, the monitoring loudspeaker is disconnected; at the same time, the transmitter, send-and-receive amplifier, dynamotor and gas engine, all start up automatically.

The same operation is true for Powell River, with the exception that the power supply employed dispenses with the gas engine, while the send-and-receive amplifier is not used.

The receiver at Campbell River is located approximately two miles from the telephone office and is switched on and off by remote control. Local interference makes it necessary to have the receiver in an isolated spot. The receiver at Powell River is located towards the outskirts of the town, and is also arranged for remote control operation.

It has been found that, once the equipment has been properly set up between two points, very few interruptions are caused by equipment defects. In fact, since the operation of the link in question has been started on a commercial basis, there has not been an interruption that has prevented an offered call from being completed, so far as the radio portion of the circuit is concerned, although that cannot be said of the land portion.

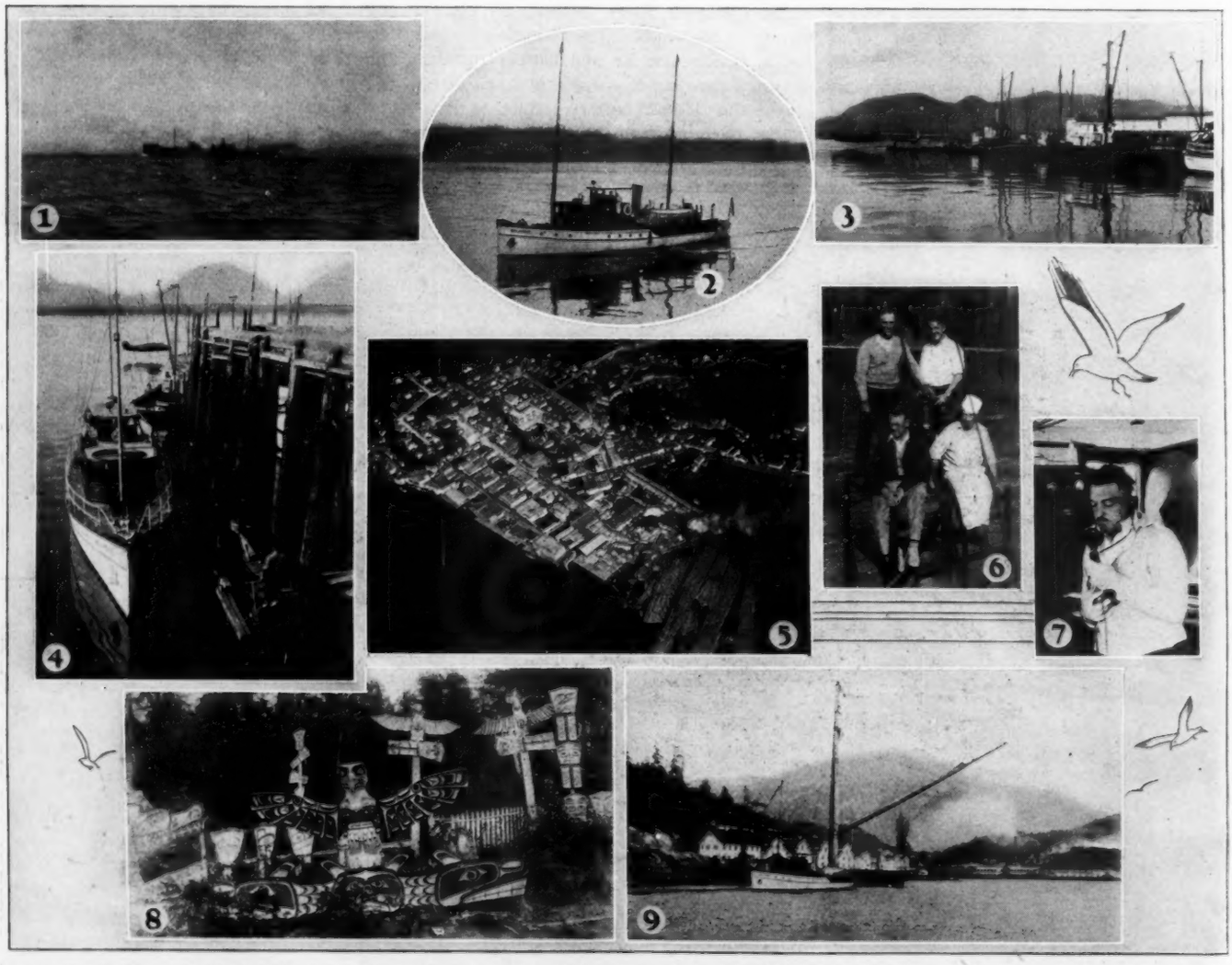
It is interesting to note that since the opening of this service, the Powell River terminal has been in operation without the assistance of a maintenance man. The operator is the only representative of the telephone company in Powell River.

The next step in the radiotelephone experimental work took a party of engineers on a cruise as far north as Ketchikan, Alaska. The North-West Telephone Co., which is affiliated with the B. C. Telephone Co., chartered the launch Belmont, and had it equipped with the Bell Telephone Laboratories' recently-developed 9-A aircraft ground transmitter. The Northern Electric Co. was associated with the Northwest Telephone Co. in the experimental cruise that followed, and it was represented by H. A. Robinson, radio engineer.

A second installation of the same equipment as that carried by the boat was installed at Vancouver. By maintaining radiotelephone communication between the Vancouver station and the Belmont at various points north, between Campbell River and Ketchigan, Alaska, reliable data for future radiotelephone extensions were obtained.

By combining the radio link with land lines, the engineers on the Belmont talked from various points to places as far away as New York and Montreal. In addition to these conversations, field strength tests were taken to gauge transmission at certain wave lengths and various distances, during different times of the day and night.

From Ketchikan, Alaska, which is about 650 miles north of Vancouver, calls were put through to Vancouver, Seattle, Chicago, New York and Montreal, the calls traveling more than 4,000 miles to reach the big Eastern cities. The route of these calls was by radio from the Belmont to Vancouver, where connection was made with the B. C. Telephone Co.'s physical



As the Camera Recorded the Cruise of the Belmont, During Which Experiments with Radio and Wire Telephony Were Conducted. (1) A Freighter Passed in Fitzhugh Sound. (2) The Belmont. (3) The Wharf at Ketchikan, Alaska. (4) The Belmont at Ketchikan. (5) An Aerial View of Ketchikan, Alaska. (6) Members of the Crew on a Bell Buoy, Near Prince Rupert, B. C., Can. In Front: H. A. Robinson, Engineer, and J. Leger, the Cook. Rear: J. Couture, the Skipper, and G. Valentine, Engineer. (7) C. H. McLean. Engineer in Charge of Cruise, at Ketchikan. (8) Totem Poles at Alert Bay. (9) The Belmont at Ocean Falls.

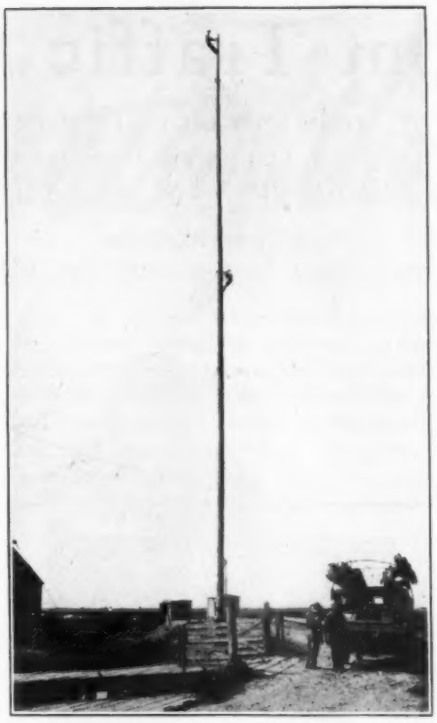
circuits, and thence by land lines to the points desired.

In one case, for a conversation between the Belmont at Ketchikan, and Powell River, a double radio circuit was used. This call went from Ketchikan to Vancouver by radio, back to Campbell River by physical circuits and then over to Powell River by radio.

As a result of the Belmont's trip, Vancouver and other cities within regular telephone reach have now talked with various points never before accessible by telephone; such British Columbia points as Ocean Falls and Prince Rupert being among these.

The Belmont sailed from Vancouver on Friday, August 22, and returned Friday, September 19, after traveling approximately 1,650 miles. She was in telephone touch with Vancouver continuously while at sea, and during the cruise calls were put through from the following places: Campbell River, Menzies Bay, Port Neville, Alert Bay, Hardy Bay, Namu, Ocean Falls, Butedale, Prince Rupert, Klemtu (China Hat), and Ketchikan, Alaska.

Preparatory to the next step in the experimental work, a temporary radiotelephone station is now being established at Ocean Falls, and additional equipment is being installed at Campbell River.



One of the 150-Foot Radio Poles Which Played a Prominent Part in the Radiotelephone Experiments.

Plan for Radio Telephone Service to Craft in New York Harbor.

Permission to erect a radio station to be used for radio-telephone communication between water craft operating in New York Harbor and vicinity and the land telephones of the Bell system is sought in an application which has been filed with the Federal Radio Commission, through the supervisor of radio of the United States Department of Commerce in New York, by the New York Telephone Co., which company contemplates the introduction of this new type of ship-to-shore service within the next year.

While the harbor radio station is planned primarily to furnish two-way telephone service between tugs, pilot boats, and smaller craft plying the harbor waters and telephones on land, if the construction permit is granted by the radio commission, it will also be used as an auxiliary to the American Telephone & Telegraph Co.'s ship-to-shore radio-telephone stations at Ocean Gate and Forked River, N. J. Further development of this service makes it desirable to establish a station in the New York Harbor area to be used in making telephone calls to these large liners when they are at Quarantine or in the immediate harbor region.

The application asks for permission to erect a shore station of 400 watts power, to be located in or near New York City. A preliminary survey of the region from the standpoint of radio-telephone service to tugs was conducted a few years ago by Bell system engineers, but additional studies will be necessary before the exact location of the proposed station can be determined.

The station will be connected to a toll or local central office of the New York Telephone Co., so that calls to persons on the harbor craft may be made from any telephone in the system. Upon receipt of a call from a telephone user on land, the central office operator will establish the connection through the radio station to the radio-telephone station on board the called craft, just as they handle calls to ocean liners on the high seas by the American Telephone & Telegraph Co.'s ship-to-shore telephone service.

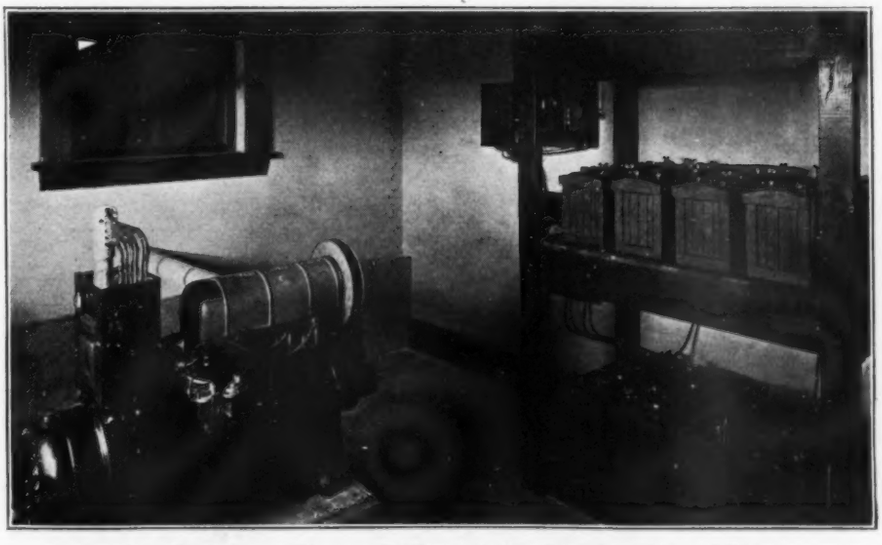
The plans for the harbor radio station are the result of surveys of the prospective need for two-way radio-telephone service in the harbor, some of which were conducted through a committee of the American Railway Association whose interest in the matter arises from the fact that large numbers of tugs in the vicinity of New York Harbor are operated by the railroad systems in handling freight through this port. These studies have convinced Bell system engineers that a real need for harbor radio-telephone service exists.

At present, there is no way in which small craft may keep in touch with their bases of operation without putting into shore and calling over land telephones. The surveys have shown that this practice causes both a waste of time and fuel, which might be conserved were it possible for the owners of the vessels to keep in close touch with their masters by telephone.

The practicability of two-way harbor telephony was demonstrated to the fire department of New York City last fall when the fireboat, John Purroy Mitchell, was equipped with radio-telephone equipment of the type originally developed by the Bell Telephone Laboratories for airplane communication. By means of this equipment and similar apparatus located in Marine Division headquarters at the battery, the master of the fireboat, when the boat is called out to fight a waterfront blaze, may keep in direct touch with his chief on land, to be directed or recalled as conditions warrant.

Before the installation of the two-way telephone apparatus, it was necessary for the fireboat to proceed directly to the scene of the fire, although often the fire proved to be of no consequence, which fact was discovered while the boat was en route.

If the application filed by the telephone company is acted upon favorably by the radio commission, the construction of the station will start immeditaely, telephone officials say. It is expected that the service will be available to all craft equipped for the purpose in about a year from the time the permit is granted.



Gas Engine and Storage Battery at the Campbell River Office.

Benefits From Traffic Conferences

Increasing Attendance at Traffic Schools of Instruction Evidence of Appreciation of the Value in Keeping Telephone Workers at Their Best—Benefits Derived from Contacts—Closing Address at Annual Illinois Traffic Conference

By Mayme Workman,

Traffic Supervisor, Illinois Telephone Association, Springfield, Ill.

One of the outstanding developments of modern times is the increasing prominence of women in industry. It is a well-known fact that women have been an important factor in the telephone industry almost from its beginning.

The first telephone exchange tried out male operators and boy messengers; but as soon as the business became organized on a basis even approaching efficiency, it became evident that this work could be performed much better by female help. Women soon took charge of the switchboards and today the public conception of telephone service can be summed up in the word, "Central" or the "Telephone Girl."

As operators, supervisors, traffic chiefs and managers of various departments, women are playing important roles in telephone organizations, and they have shown themselves peculiarly fitted for this particular kind of work.

Telephone operators today are highly-specialized sales people, selling an exclusive service to a critical and, generally speaking, appreciative public. And as salesmen are kept at their best by sales conferences, so telephone workers are kept at their best by traffic conferences and schools of instruction.

This is being appreciated more every year, as evidenced by the increasing attendance at the schools of instruction conducted by your association at its district meetings and its state convention. There were 505 operators in attendance at eight district meetings conducted by your association this year and these operators represented 247 towns.

In addition to the valuable information and knowledge gained in these conferences, many benefits are derived from the contacts made with people engaged in the same industry and who have the same interests. I realized this more fully after attending the national convention in Chicago in October. A great deal of my pleasure was derived from seeing familiar faces and chatting with friends and acquaintances.

As part of the traffic program at the national convention, we visited the telephone exchange of the Illinois Bell Telephone Co. There were many interesting things to be seen there, among them the telephoto and teletype equipments where pictures and messages are transmitted over telephone wires.

We also visited the training department where applications are received and prospective operators are given mental tests. They have nine separate classrooms where a three weeks' course of training is given prospective operators. We were told that there were 26,000 applications filed last year and 3,500 girls were instructed in telephone work, indicating an increasing demand for women in the industry.

"As Salesmen are Kept at Their Best by Sales Conferences," says Mrs. Workman, "So Telephone Workers are Kept at Their Best by Sales Traffic Conferences and Schools of Instruction."

We are about to close the traffic conference of our 26th annual state convention. Our conventions remind me of an "Old Fashioned Thanksgiving Dinner." Preparations were made for days in advance. Pies were baked, the cookie jars were filled, the turkey gobbler was selected, and everyone looked forward to the festive day.

Friends and relatives came from far and near to partake of the sumptuous repast. And after everyone had partaken of the choice morsels prepared for them and had enjoyed the happy hours spent together, farewells were said with regret because the day had come to a close, all too soon.

We, too, plan for our state convention for days and weeks in advance. We try to have something of interest for everyone in attendance—informative talks for the men, classroom instruction for the operators, and instructive talks for men and women interested in traffic work.

As I said yesterday, "All work and no play make Jack a dull boy"; so we provide entertainment in the form of a theater party, dancing for those who like to trip the light fantastic, and tonight we will have our banquet, entertainment and dance.

The success of any undertaking depends largely upon advance planning and cooperation. In arranging the traffic program, subjects were selected that we believed would be of interest and benefit to those in attendance in the traffic conference. But after the program was set up, cooperation was needed to carry it out. Invitations were extended to various telephone workers in this and other states, to take part in the program. Participants in the program expressed a desire and a willingness to do their particular bit to the best of their ability.

I am proud of the girls and the manner in which they handled their subjects. While they are not "speech-makers," as some of the girls told me when they were invited to take part in the program, they had the right spirit and were willing to do everything possible to make the traffic conference a success. For some of the girls it was their first appearance on a traffic program, and, remembering my first time, I know just what that meant to them.

I wish to express my sincere appreciation to all of the participants in the traffic program for their wonderful cooperation and assistance; and to the men who gave their time and interest to make our program a success, we are sincerely grateful. Valuable information was derived from their discussions.

Appreciating the benefits derived from our traffic conferences, we hope during the coming year you will continue to take advantage of the opportunities afforded by your association and attend the schools of instruction conducted by the district meetings, so that we will be able to give the public what they expect to receive—courteous, accurate and efficient service.

Prices in the Metal Markets.

New York, December 22: Copper—Steadier; electrolytic spot and future, 10@10¼ . Iron—Steady. No. 2, f. o. b. eastern Pennsylvania, $17.00@18.00. No. 2, f. o. b. Buffalo, $15.50@16.00; No. 2 f o. b. Alabama, $10.50@14.00. Tin—Strong; spot and nearby, $25.50; future, $25.75. Lead—Steady; spot New York, 5.10c; East St. Louis, 4.95c. Zinc—Firmer; East St. Louis spot and future, 4.05@4.10.

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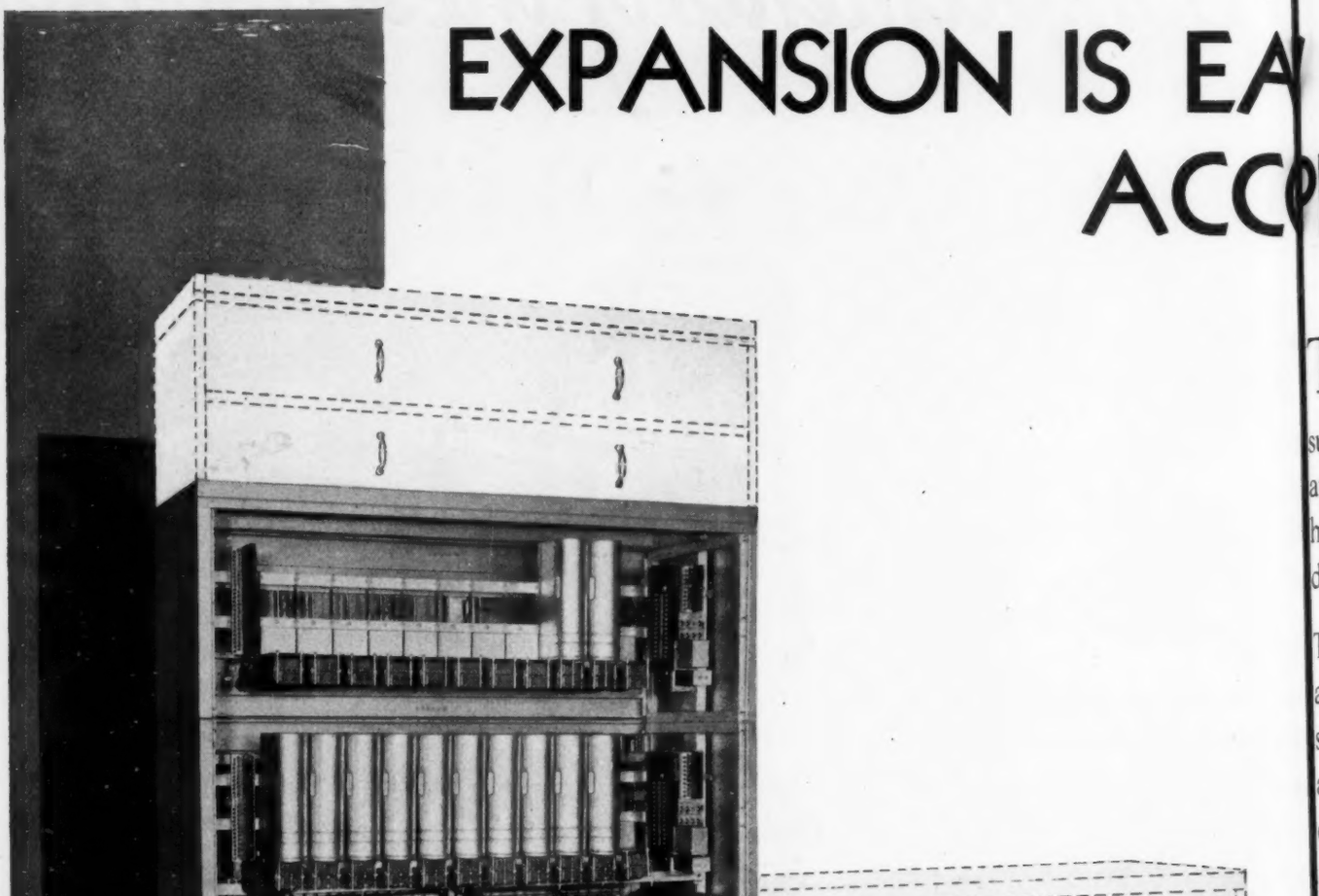

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The Financial Side of Companies

Miscellaneous Items of Interest Regarding Financial Matters of Telephone Companies—New Securities Issued During Past Month—Figures From the Monthly Reports of Larger Companies to Interstate Commerce Commission

Loss of 1.7 Per Cent Reported in Income of 103 Class A Companies.

Compilations from reports of revenues and expenses for September, 1930, of 103 class A telephone companies, as submitted to the Interstate Commerce Commission, show gross operating revenues of $97,896,824 as compared with $95,822,024 for the corresponding month of 1929, showing an increase of 2.2 per cent for the current year.

Operating expenses for September, 1930, were $66,883,304, which is an increase of 4 per cent over 1929. The operating income for the same month was $22,924,763, as compared to $23,363,449 of 1929, a decrease of $438,686 or 1.9 per cent.

Operating revenues for the nine months ending with September, 1930, were $886,497,329, as compared with $851,442,322 for the corresponding period in 1929, showing an increase of 4.1 per cent for 1930. Operating expenses for the same period were $608,051,876 and $573,284,123, respectively, showing an increase of 6.1 per cent for 1930. The operating income for the three months of 1930 amounted to $202,043,343, as compared with $205,533,779 for the same period of 1929, a decrease of 1.7 per cent for 1930.

The companies, which include those having annual operating revenues over $250,000, had 17,106,253 telephones in service at the end of September, 1930, an increase of 2.4 per cent over that of 1929, when there were 16,703,121.

Tri-State Company's Ten-Month Earnings Show Slight Decrease.

Gross earnings of the Tri-State Telephone & Telegraph Co., of St. Paul, Minn., were less for the first 10 months this year than last, while operating expenses increased. President G. W. Robinson, in a statement to stockholders, reports that earnings for the period were $5,077,128, against $5,080,071 for the 10 months last year.

Expenses this year were $4,058,561, against $3,927,636 last year, the increase being caused largely by the cost of valuating the property in connection with the pending rate case.

Net for the 10 months was $1,018,566, or 3¼ times preferred stock dividends.

Wisconsin Company Offers $38,000 7 Per Cent Preferred Stock.

The Langlade Telephone Co., with headquarters in Antigo, Wis., has issued $38,000 7 per cent preferred stock at $100 per share, par value, dividends payable semi-annually on January 1 and July 1. This preferred stock is being sold by the Langlade company to provide a part of the cost of acquiring the properties of the Antigo Telephone Corp. and the Military Road Telephone Co.

Upon completion of the present financing, the company will have the following capitalization: First mortgage 6 per cent gold bonds, series A, due 1945, $125,000; preferred stock, $38,000; common stock, no par value, 500 shares.

The Langlade Telephone Co. was incorporated this year for the purpose of acquiring all of the property, franchises and other assets of the Antigo Telephone Corp. and the Military Road Telephone Co. Local and long distance telephone service is furnished to the city of Antigo, the villages of Lily and White Lake, and a part of the surrounding rural territory. The company also has connections with a number of rural lines which are owned by farmers' mutual companies, and handles the switching of calls originating on these lines through its central office under contract agreements. It serves directly 2,026 stations and furnishes switching service to 469 additional rural stations of roadway connecting companies.

The Langlade company owns toll lines connecting the Antigo exchange with those at Mattoon, White Lake and Lily, and owns jointly with the Wisconsin Telephone

Items.	Month of September		Increase or decrease (*).		Nine months ended with September		Increase or decrease (*).	
	1930	1929	Amount	Ratio, Pct.	1930	1929	Amount	Ratio, Pct.
Number of company stations in service at end of month	17,106,253	16,703,121	403,132	2.4	.....	.....	.....	....
Revenues:								
Subscribers' station revenues	$59,204,337	$56,716,876	$2,487,461	4.4	$536,860,444	$508,692,998	$28,167,446	5.5
Public pay station revenues	3,835,353	3,626,554	208,799	5.8	36,719,755	34,430,855	2,288,900	6.6
Miscellaneous exchange service revenues	888,878	839,190	49,688	5.9	8,104,475	7,183,281	921,194	12.8
Message tolls	27,019,117	28,188,751	*1,169,634	*4.1	243,434,515	246,763,628	*3,329,113	*1.3
Miscellaneous toll line revenues	4,131,973	3,816,971	315,002	8.3	36,565,583	32,091,325	4,474,258	13.9
Sundry miscellaneous revenues	2,780,823	2,594,866	185,957	7.2	24,493,021	21,970,053	2,522,968	11.5
Licensee revenue—Cr.	1,263,929	1,242,339	21,590	1.7	11,425.852	10,935,821	490,031	4.5
Licensee revenue—Dr.	1,227,586	1,203,523	24,063	2.0	11,106,316	10,625,639	480,677	4.5
Telephone operating revenues	$97,896,824	$95,822,024	$2,074,800	2.2	$886,497,329	$851,442,322	$35,055,007	4.1
Expenses:								
Depreciation of plant and equipment	$16,274,327	$15,049,352	$1,224,975	8.1	$142,878,120	$129,744,387	$13,133,733	10.1
All other maintenance	16,410.055	15,173,904	1,236,151	8.1	149.274,717	139,711,200	9,563,517	6.8
Traffic expenses	19,210,422	20,016,230	*805,808	*4.0	179,132,813	178,149,529	1,033,284	0.6
Commercial expenses	9,170,156	8,930.488	239,668	2.7	83,663,907	79,396,328	4.267,579	5.4
General and miscellaneous expenses	5,818,344	5,169,934	648,410	12.5	53,052,319	46,282,679	6,769,640	14.6
Telephone operating expenses	$66,883,304	$64,339,908	$2,543,396	4.0	$608,051,876	$573,284,123	$34,767,753	6.1
Net telephone operating revenues	$31,013,520	$31,482,116	*$ 468,596	*1.5	$278,445,453	$278,159,199	$ 287,254	0.1
Other operating revenues	$ 115,317	$ 100,997	$ 14,320	....	$ 874,696	$ 969,704	*$ 95,008	....
Other operating expenses	62,676	70,925	*8,249	....	525,044	659,912	*134,868	....
Uncollectible operating revenues	781,378	620,259	161,119	26.0	6,854,212	5,377,117	1,477,095	27.5
Operating income before deducting taxes	$30,284,783	$30.891,929	*$ 607,146	*2.0	$271,940.893	$273,090,874	*$ 1,149,981	*0.4
Taxes assignable to operations	7,360,020	7,528,480	*168,460	*2.2	69,897,550	67,557,095	2,340,455	3.5
Operating income	$22,924,763	$23,363.449	*$ 438,686	*1.9	$202,043,343	$205,533,779	*$ 3,490,436	*1.7
Ratio of expenses to revenues, per cent	68.32	67.15	1.17	....	68.59	67.33	1.26	....

Comparative Statistics of 103 Class A Companies Compiled from September Reports to the Interstate Commerce Commission.

Co. the toll line between Antigo and Elcho. Under an operating agreement it maintains the toll switchboard of the Wisconsin company which is housed in the Antigo exchange of the Langlade company. It also switches the toll calls of the Wisconsin company which pass through Antigo.

The switchboards at the Antigo, White Lake and Lily Exchanges have a total capacity of 1,500 lines. The company owns 2,252 circuit miles of cable lines and 456 circuit miles of open-wire lines. Practically all of the lines in the city of Antigo are enclosed in cable.

Antigo, Wis., is located in the center of a large agricultural district. Other important industries are the manufacture of wood products, dairy products, fertilizer and brick. Agriculture has developed rapidly in this area in the last few years, as well as industrial activity.

The depreciated value of the property now owned by the Langlade Telephone Co. is estimated to be in excess of $230,000. Approximately 85 per cent of this value is placed on part of the properties on the basis of an appraisal of that part by independent engineers as of September 1, 1926, plus subsequent additions at book cost. The balance of about 15 per cent is placed on the remainder of the properties on the basis of a recent appraisal by the company.

The combined results of the operations for the year 1930, based upon figures as of June 30, 1930, are as follows: Operating revenues, $64,481.66; operating expenses, deductions from gross income, taxes and uncollectible revenue, $35,292.44; and operating profit before depreciation, $29,189.22. Based on previous operations the future profits available to take care of interest and dividend requirements are estimated to be about twice.

Walter J. Gallon is president of the Langlade company. He is also president of the Wisconsin State Telephone Association.

October Earnings of Companies Reported to Interstate Commission

The current earnings in October and in the first 10 months of 1930 of the American Telephone & Telegraph Co., as reported to the Interstate Commerce Commission, were:

Month of October:	1930.	1929.
Total oper. revenue	$ 9,803,118	$10,074,025
Net oper. revenue	3,208,291	4,233,618
Oper. income	2,821,246	3,484,464
Ten months:		
Total oper. revenue	$95,868,329	$92.517,916
Net oper. revenue	33,331,716	39,955,736
Oper. income	27,747,353	33,151,600

The Pacific Telephone & Telegraph Co. for the ten months ended October 31 reported a net income of $14,379,109 after depreciation, taxes and charges. This is equal after preferred dividends to $5.69 a share earned on 1,804,867 common shares, comparing with $13,059,451, or $9.63 a share, earned on 930,000 common shares in the same period of 1929.

The gross revenues were $88,534,183, against $83,213,170. The October gross revenues were $9,112,835, against $8,818,-526 in October, 1929; net income, $1,629,-183, against $1,443,727, after depreciation, taxes and charges.

Reports of other companies follow:

Carolina Telephone & Telegraph Co., Tarboro, N. C.

	1930.	1929.
October gross	$ 110,565	$ 114,944
Net after taxes	24,297	30,762
Ten months' gross	1,092,282	1,129,708
Net after taxes	267,488	295,464

Chesapeake & Potomac Telephone Co. of Baltimore, Md.

October gross	$ 1,191,919	$ 1,188,420
Net after taxes	280,383	293,458
Ten months' gross	11,566,453	11,149,895
Net after taxes	2,647,236	2,557,445

Chesapeake & Potomac Telephone Co. of New York.

October gross	$ 750,980	$ 714,693
Net after taxes	180,688	149,179
Ten months' gross	7,147,869	6,897,221
Net after taxes	1,426,325	1,325,209

Northwestern Bell Telephone Co.,

October gross	$ 2,991,171	$ 2,913,085
Net after taxes	762,348	730,423
Ten months' gross	29,118,809	28,146,625
Net after taxes	7,116,870	7,112,939

United Telephone Co., Abilene, Kans.

October gross	$ 172,983	$ 164,558
Net after taxes	37,161	28,549
Ten months' gross	1,723,596	1,626,987
Net after taxes	379,626	359,652

Bell Telephone Co. of Pennsylvania.

October gross	$ 6,419,047	$ 6,496,700
Net after taxes	1,543,481	1,776,012
Ten months' gross	63,155,136	61,266,475
Net after taxes	14,990,068	15,706,193

Michigan Bell Telephone Co.

October gross	$ 3,439,417	$ 3,621,237
Net after taxes	525,327	736,219
Ten months' gross	34,766,208	34,634,332
Net after taxes	5,462,474	7,378,528

Southern New England Telephone Co.

October gross	$ 1,507,330	$ 1,465,611
Net after taxes	378,247	379,679
Ten months' gross	14,626,892	13,800,475
Net after taxes	3,566,116	3,398,706

Indiana Bell Telephone Co.

October gross	$ 1,121,753	$ 1,154,560
Net after taxes	260,144	270,917
Ten months' gross	11,206,793	11,037,086
Net after taxes	2,628,376	2,758,444

Rochester, N. Y., Telephone Corp.

October gross	$ 458,211	$ 453,782
Net after taxes	113,943	123,553
Ten months' gross	4,453,147	4,310,938
Net after taxes	1,022,586	1,033,928

Cincinnati & Suburban Bell Company.

October gross	$ 887,111	$ 884,542
Net after taxes	206,641	201,693
Ten months' gross	8,753,133	8,655,169
Net after taxes	1,958,801	2,001,477

Nebraska Company Asks Commission for Authority to Dissolve.

The Monroe Independent Telephone Co. is taking the preliminary steps to liquidate and dissolve as a corporation. It has asked the Nebraska State Railway Commission for authority to sell its properties at Albion, Genoa, Newman Grove, Lindsay, Loretto and Monroe, Neb., to the Continental Telephone Co. for an agreed consideration of $378,000; also for authority to sell its exchange at Platte Center to the Platte Center Telephone Co., a newly-organized company with a capital stock of $75,000, of which R. B. Still is president.

Control of this company has been lodged for several years in the Continental Telephone Co. of Nebraska, while at Platte Center it has shared the ownership of a combined telephone exchange and rural system with Mr. Still. The latter emerges from the deal with control of that exchange, and its divorcement from the Continental chain will follow the approval of the commission of the transaction.

The Continental company owns a number of exchanges in the state, and only recently has begun to lodge ownership title to these properties in itself.

The Continental Telephone Co. is capitalized for $2,400,000, and is authorized to issue 7,500 shares of preferred stock and 16,500 shares of common stock. At the present time it has outstanding $400,000 preferred and $1,120,000 of common.

The reproduction new value of the Monroe company's properties, with Platte Center omitted, is $481,042, with a depreciated or present value of $401,434. Its net worth is $378,000. In exchange for the property, the Continental company proposes to issue 3,780 shares of stock and to sell $33,400 more stock to retire existing indebtedness.

The Platte Center Telephone Co. is to purchase the local exchange owned by the Monroe company by issuing 360 shares of its common stock to the Monroe company and 145 shares to Mr. Still for his property interests. The combined properties have a reproduction new value of $65,284, a present value of $52,981 and a net worth of $50,939.

The two applications set out that neither of these companies parallels any other telephone company, and hence it is unnecessary to give the 60-day notice required by the constitution where there are sales or mergers of paralleling companies in contemplation.

The Monroe company was formerly owned by the Bratt interests, with whom were associated a large number of farmers, the company having grown from a community enterprise at Monroe into a system with nearly 3,500 stations.

Bell Company of Pennsylvania to Issue New Common Stock.

The Bell Telephone Co. of Pennsylvania will shortly receive $20,000,000 through new financing. The financing will be effected by the sale of 200,000 shares of common stock at par value of $100 per share to holders of the common stock, all of which is owned by the American Telephone & Telegraph Co.

Announcement to this effect was made

December 4 following a meeting of the board of directors of the Bell company, at which the proposed issue was authorized.

The additional capital will be used only as needed for capital expenditures to take care of the growth of the company's business, it was stated.

At a special meeting of stockholders held previous to the board meeting, it was voted to increase the authorized capital stock of the company to $250,000,000 from $110,000,000.

Current Price Quotations on Listed Telephone Stocks.

	December 18, 1930. High.	Low.	Last.
Allied Telephone Utilities..	25⅛	25	25⅛
American Telephone & Telegraph Co.	179⅞	170⅜	179⅜
Associated Telephone & Telegraph Co.	68	67	68
Associated Telephone & Telegraph Co., 6 per cent pfd.	88½	88½	88½
Associated Telephone Utilities Co.	19¼	18⅛	19¼
Bell Telephone of Canada..	145	144	144
Chesapeake & Potomac Telephone Co., pfd.	116½	116¾	116½
Community Telephone Co..	13½	11½	13½
International Telephone & Telegraph Corp., 2.	23⅛	21⅛	22¾
Mid-West States Utilities Co., 1¾	20	18	20
New York Telephone Co., pfd. (6½)	114¼	114¼	114¼
Ohio Bell Telephone Co., pfd.	106½	106½	106½
Pacific Telephone & Telegraph Co.	118¼	114½	117½
Telephone Bond & Share Co.	53¾	53	53½
Western Power, Light & Telephone Co.	20½	20⅛	20½

OVER THE COUNTER QUOTATIONS.

	Dec. 17. Bid.	Asked.	Dec. 16. Bid.
Associated Telephone Utilities Co., $6, pfd.	80	..	..
Associated Telephone Utilities Co., $7, pfd.	95	..	..
Cuban Telephone Co., 8.	115	..	115
Cuban Telephone Co., 7, pfd.	87	92	87
Lincoln Telephone & Telegraph Co.	120	...	120
Mountain States Telephone & Telegraph Co., 8.	141	144	141
New England Telephone & Telegraph Co., 8.	129	132	132
New York Telephone Co...	21	26	21
Northwestern Bell Telephone Co., pfd.	107	109	107
Peninsular Telephone Co., $1.40	20	23	20
Peninsular Telephone Co., pfd., A, 7.	102	105	103
Porto Rico Telephone Co..	85	..	85
Rochester Telephone Corp., 1st pfd.	108	110	108
Southern New England Telephone Co., 8.	157	163	157
Southwestern Bell Telephone Co., pfd., 7.	118	119	117½

Associated T. & T. Co. Plans for Exchange of National Stock.

Associated Telephone & Telegraph Co., Chicago, Ill., through its financial agent, Telephone Securities Co., has announced a plan by which holders of the class A stock of National Telephone & Telegraph Corp. may exchange their shares on an attractive basis for Associated Telephone & Telegraph Co. shares. The exchange offer, which is for the purpose of simplifying the capital structure of the associated company and subsidiaries, is subject to cancellation without notice March 1, 1931.

Under the exchange plan the holder of each share of National Telephone & Telegraph Corp. class A stock, resident in the United States, may receive one-half share of the $6 first preferred stock and one-quarter share of the class A stock of Associated Telephone & Telegraph Co.

The combined call price of the Associated stock received in exchange will be equal to $83.75 per share as compared to the present call price of the National stock of $60 a share. Dividend income after the exchange of shares, it was stated, will be in excess of that now received on the National A stock.

The Associated Telephone & Telegraph Co., it was stated, owns all the common stock of the National Telephone & Telegraph Co., which company controls the British Columbia Telephone Co., the second largest telephone company in Canada. The Associated company also controls other operating telephone companies abroad as well as automatic equipment factories in the United States and Europe.

Chicago exchange governors have approved the listing of $10,000,000 5 per cent first mortage bonds of the British Columbia Telephone Co. Proceeds of the bond issue will be used to retire the first mortgage debenture stock and for capital extensions and improvements.

Number of Stockholders of Associated Telephone Utilities Co.

Figures supplied the press the middle of the month by the Associated Telephone Utilities Co., Chicago, give further evidence of the widening of the distribution of utility stocks.

The company reports that the number of its stockholders has increased 25 per cent since the end of last year. Common stockholders now number 4,363.

Consolidation of Companies in Nebraska; Promotion Discouraged.

The Western Telephone Corp. of Salina, Kans., of which Nathan L. Jones is the head, is extending its operations in northeastern and central Nebraska. It owns 13 exchanges at the present time, and has announced the acquisition of the Farmers' Union Telephone Co. of Winnetoon. Negotiations are in progress for several other companies.

E. C. Hunt, who began with the Citizens' Telephone Co., of Malmo, has also been strengthening his position in the same section of the state, and now owns four other companies, each with two or more exchanges. The Continental Telephone Co., through purchases in that section in the last two years, has aided in contributing to the disappearance from the telephone map of approximately 25 small and medium-sized telephone companies, in the western part of the state.

The Nebraska Central, a Denver-owned corporation, bought a dozen small exchanges there within the last year or two. The Lincoln Telephone & Telegraph Co. has taken over several during the year.

The fact that the approval of the Nebraska State Railway Commission is not needed unless a paralleling of territory is involved in a purchase, and hence a suspicion by the law of being an attempt to create a monopoly, has prevented any supervision or scrutiny of purchases. Members of the commission say that so long as the law with respect to purchasing competing companies is not involved, they are not interested; but that when any stock issues are asked for, the securities issues will be limited to the actual value of the property purchased and not be measured by the prices paid.

The commission recently cut materially the securities total asked by one company, and in another case ordered the general manager to reduce to the cost levels of the Lincoln and Bell companies the allocated charges for his service. These measures have been taken with an intention to discourage any investment promotion in the telephone field, they say.

Nine Months' Net of International T. & T. Shows $3,348,460 Decrease.

Consolidated net income of the International Telephone & Telegraph Corp. and its associated companies for the nine months ended on September 30 was $3,348,460 less than in the same part of 1929, according to a report issued by the company on December 11. The income was $10,265,345, compared with $13,613,805 the year before.

This was equivalent to $1.55 a share on the 6,642,232 shares outstanding at the end of the period, or 5 cents a share above the dividend requirements. For the nine months in 1929, earnings were equivalent to $2.33 a share on the stock outstanding at the end of that period, but there then were 788,091 fewer shares out.

A statement from the company issued with the report said:

"The general curtailment of business activity in this country and in foreign countries continues to affect adversely our telegraph and cable revenues. Our manufacturing properties are showing increased sales and profits over last year, and the earnings of the telephone operating properties, while somewhat affected by the world-wide conditions, should not be greatly below those of last year."

Consolidated income accounts for the first nine months of 1930 and 1929 follow:

Earnings	$76,695,748	$76,169,612
Expenses, taxes, depreciation ...	57,889,443	54,967,372
Assd. company's charges	4,512,259	5,219,007
Interest	4,028,701	2,369,428
Net income	10,265,345	13,613,805
Dividends	9,547,378	7,924,210
Surplus, Sept. 30.	28,790,720	26,686,568

The income of the Compania Telefonica Nacional de Espana (Spanish Telephone Co.) is included in the income account only to the extent of interest and dividends received.

Aircraft Radio Telephone Successful

Conclusive Demonstration by Air Transport Company Proves That Plane-Ground Voice Communicationis Not Only Practicable, but Successful—Discussion of Other Developments in Air Transport Communication in 1930

By Robert Johnson

The somewhat long-standing controversy over the relative merits of aircraft radiotelephone versus code communication seems to have been definitely settled in favor of the radiophone proponents, following the conclusive demonstration by one of America's leading air transport companies that plane-ground voice communication is not only practicable but also eminently successful.

The marked progress made during 1930 in the application of radio telephony to airplanes, under the leadership of the Boeing system, has unquestionably been the outstanding development of the year in aviation communication. Other important phases of this field include the directive radio beacon, the interstation, teletype circuit and the ground telephone system.

The chief point of contention between advocates of the radiophone and code systems has been the premise that electrical interference from various sources on the airplane itself was an insuperable obstacle to the successful operation of the aircraft radio telephone. Those favoring the code system citied cases in European and American air transport operations where the short-wave radiophone communication system had been attempted without success, and subsequently discarded in favor of code.

However, the advantages of the radio telephone were so great that the Boeing system, working in cooperation with the Department of Commerce and the various radio equipment manufacturers, set about to conquer the obstacles.

Code communication necessitated a radio operator aboard the planes, and, of course, was impossible in the smaller aircraft without space adequate to accommodate the additional person. Also, code was somewhat tedious and slow compared with radiotelephone voice communication. On the other hand, the radiophone would permit the pilot to communicate easily and swiftly with the ground station operators, without interfering with his work in flying the plane.

The development and installation of the Boeing radio telephone equipment was described in a previous article (TELEPHONY of December 28, 1929). Since that time it has been demonstrated that this system of plane-ground communication is fully successful.

Thorp Hiscock, chief communication engineer for the Boeing system, sums up the reasons for this success as follows:

"Our radio telephone installation was predicated upon proper silencing electrically of the airplane itself before the equipment was placed in operation. Had we not pushed the interference down below the level of our sensitive receiver, our system of communication would have failed."

The major cause of interference was the ignition system. This was throttled by properly shielding and harnessing the spark plugs, the leads to the magnetos, and the magnetos themselves. Bonding of the airplane was also highly important. It was found that in a case where one metal part could rub against another piece of metal, there resulted terrific crashes of interference which completely paralyzed reception.

Pilot's Radio-Equipped Headgear. Pilot Russell Cunningham of the Boeing System Demonstrates the Radio Helmet, With Its Built-in Earphones and Attached Microphone.

The bonding of the airplane was successfully accomplished by commencing with a bare fuselage, placed on the assembly floor of the Boeing Airplane Co. at Seattle, Wash. As each part was added to the structure, it was tested for interference; and when interference developed, the part was bonded. Thus when the airplane stood completely assembled it was fully prepared for the radiophone installation. The procedure was standardized for application to all future aircraft production at this plant.

The Boeing system has found that reception is actually more effective in the airplanes than at the ground stations, a tribute indeed to the thoroughness of the bonding and shielding methods. This fact definitely refutes the argument that interference emanating from the airplane would block aircraft radiotelephony.

What results have been obtained from the plane-ground radio telephone? A few examples of its use on Boeing system's airways will serve to show its significant position in the scheme of air transport operations, and will show why it is being regarded as one of the greatest steps toward safety in flying during recent years.

The Boeing system's coast plane had reached Portland. Seattle, the northern terminal airport, was 150 miles to the north. The weather reports showed a belt of fog at Seattle. The Portland radio telephone operator called the Seattle station, asking for weather conditions. The Seattle operator replied that there was a blanket of dense fog hanging 500 feet above the field, but advised that if the pilot flew to the Seattle field, he could land through the help of the radiophone.

An hour and a half later, attendants at the field heard the plane's engine overhead. The radio operator advised the pilot of his position, and told him that the field was clear for landing, and that there was a "ceiling" of 500 feet. Armed with that essential information, the pilot nosed down through the fog belt and emerged over the airport to effect a safe landing.

A second example shows another important function of the radio. A Boeing plane took off from Salt Lake City, westbound to Elko on the transcontinental airway. When the pilot left Salt Lake, the weather reports indicated good weather over the entire division. Presently, however, a new report showed a bad storm approaching the line from the north, 75 miles west of Salt Lake City. The radio operator called the pilot and advised him of the oncoming storm. The pilot promptly climbed to an altitute of 13,000 feet and passed safely over the bad weather area.

On the coast route, a pilot was flying from Oakland to Medford on the northbound schedule. He noticed that his battery was apparently weakening. Ordinarily this would involve a long delay at the airport, as the attendants, after learning of the situation following the pilot's landing, would have to secure a new battery. This would eat up time made precious by the necessity of carrying the mail through on schedule.

The flyer radiophoned ahead and told the operator to have a new battery ready for replacement. When he landed at the division airport, the battery was awaiting him and the mechanics quickly changed the bat-

teries. The plane took to the air again without loss of time.

Concisely, the radio telephone speeds up air mail operations and increases their safety. It eliminates uncertainty regarding weather conditions on the line of flight ahead, and it permits the ground personnel to be at all times fully aware of the position of the various company planes flying over the airways. It is the block system of the air, and the pilots are in closer touch with the operators at the ground stations than are railroad engineers with their station staffs.

The radio stations along the Boeing airways are clearing stations for weather reports and traffic orders. Each station is equipped with a teletype printer, and the Department of Commerce has established teletype circuits to link the weather reporting stations.

The point-to-point communications between the radio stations are handled over the teletype system. These messages cover departures, arrivals and position reports of aircraft. Each station on the teletype circuit has an assigned call bell by which messages intended for any one station can be identified and acknowledged without delay. The instantaneous communications system provided by teletype is essential for aeronautical communications where a fast system of transportation requires even a faster system of communications.

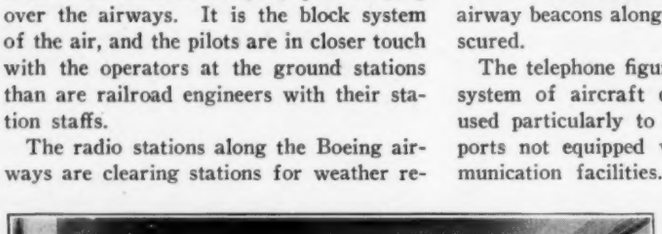
The U. S. Department of Commerce directive radio beacon service is another important division of communications which figures materially in aiding air transportation. The 906-mile stretch between Chicago and Cheyenne on the Boeing system's transcontinental air route was equipped with this beacon service during 1930. This service consists of a series of code signals received by the pilot in flight and routed into his earphones.

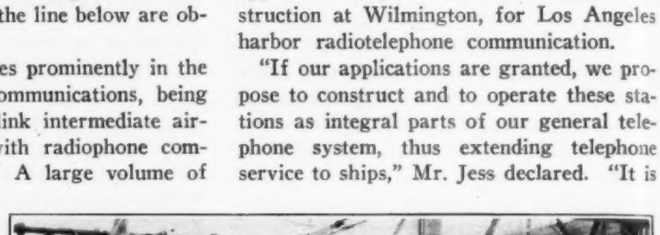
When he hears a "dot-dash" signal, he learns he is veering to the left of the course; when he hears a "dash-dot" signal, he learns he is deviating to the right of the line of flight. A continuous stream of dash signals indicate to the pilot that he is flying correctly on his true course over the airway.

This service is a valuable aid to the flyer in keeping on the route during unfavorable weather conditions or at night when the airway beacons along the line below are obscured.

The telephone figures prominently in the system of aircraft communications, being used particularly to link intermediate airports not equipped with radiophone communication facilities. A large volume of messages is routed regularly over the telephone lines.

The unusually active development of communication facilities as applied to air transportation during 1930 has been a great forward step in the elimination of weather hazards and in increasing the safety of air transport operations.





This View of a Typical Boeing System Radiotelephone Station Illustrates the Type of Equipment Required for Two-Way Aircraft Radiophone Communication. A, the Receiver; B, the Microphone; C, the Rectifier; D, the Antenna Transmission Lines; E, the Transmitter, and F, the Teletype Printer—Radiophone Compartment in Mail-Passenger Plane Showing the Installation of Radiotelephone Transmitting and Receiving Equipment Aboard a Boeing Four-Passenger Mail Plane.

Public Radio Telephone Service to Ships in Pacific Coast Harbors.

Public telephone service with vessels, notably tugs and small boats plying in the Pacific coast ports, was proposed by subsidiaries of the Bell system at a hearing before the Federal Radio Commission on December 18.

To be operated as "integral parts" of the general telephone system, by extending telephone service to ships, the proposed service would make possible direct telephone communication between the general land-wire system, and passengers on vessels in the contiguous waters, with the overwater link made by radio.

"It is the aim of the Bell system to extend its service from time to time to enable anyone, anywhere, to pick up a telephone and talk to anyone else, clearly and quickly, and at reasonable cost," G. H. Jess, assistant vice-president of the Pacific Telephone & Telegraph Co. and the Southern California Telephone Co., declared before Examiner Elmer W. Pratt.

The Pacific company has applied to the commission for construction permits to cover the construction of stations in or near Seattle, and in or near San Francisco. The Southern California company also has applied for a permit to cover similar construction at Wilmington, for Los Angeles harbor radiotelephone communication.

"If our applications are granted, we propose to construct and to operate these stations as integral parts of our general telephone system, thus extending telephone service to ships," Mr. Jess declared. "It is our purpose initially to furnish radio telephone service to tug boats and other small harbor craft. The chief demand at present appears to be for service to such craft.

"Our experience in the furnishing of this service to harbor craft would be beneficial in the subsequent extension of such service to coastal ships operating in Pacific coast waters, and we would expect to so extend the service at a subsequent date."

Lloyd Espenschied, engineer of the American Telephone & Telegraph Co., discussed technical considerations involved in the establishment of harbor radiotelephone service for the three locations. He said that perhaps the most difficult part of the whole problem is that of obtaining the necessary strength and reliability of radio transmission with which to reach craft in various parts of a large harbor and along the nearby coast line, without exceeding the bounds of reasonable cost for the shore station and corresponding ship stations.

The requests of the two Bell subsidiaries are for three frequencies between 1,500 and 2,000 kilocycles, with each of the stations to have 400 watts of power. An application for similar service at six Pacific coast ports, filed by the Northern Radio Telegraph Co., at Seattle, was withdrawn by Louis G. Caldwell, counsel.

Here and There in Telephone Work

P. B. X. Operating Current Supply; Meter Test (Cont'd.)

By John A. Bracken.

In order to make a voltmeter test of a P. B. X. storage cell to determine its condition of charge, it is necessary that the battery deliver current; that is, a discharge load should be put on the battery before making this test. The amount of the load should be at least one-tenth of the ampere-hour capacity of the battery, or perhaps a little higher.

While the cells are thus discharging, the voltage of each cell can be accurately measured with the voltmeter. If they are in a charged condition, the voltage should be approximately 2.1 volts per cell, but not less than two volts. If the voltage drops to 1.7 volts, the cell is practically discharged.

To insure accuracy, the voltmeter test should be used in conjunction with the hydrometer, since a variation as low as one-tenth volt makes considerable difference in what the reading indicates regarding the condition of the cell.

It is one of the peculiarities of the cell that when on open circuit—that is, not connected in circuit with a load of any kind—it always shows approximately two volts whether it is almost fully charged or almost the reverse. Consequently, voltage readings taken when the cell is neither charging nor discharging are valueless except when a cell is out of order. Voltage tests, therefore, should be made only when the cells are discharging.

When making voltage tests, it must be borne in mind that the voltage of a cold cell rises slightly above normal on charge and falls below normal on discharge. The reverse is true of a warm cell in hot weather; that is, the voltage will be slightly less than normal on charge and higher than normal on discharge.

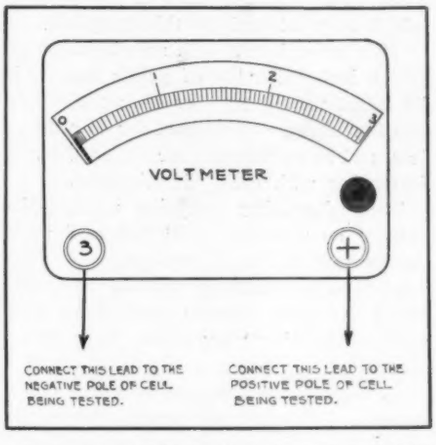
As explained in connection with hydrometer tests of the electrolyte, the normal temperature of the electrolyte is regarded as 70 degrees Fahrenheit, but this refers only to the temperature of the liquid itself as shown by the battery thermometer, and not to the temperature of the air.

When the specific gravity tests high and the voltage drops during the test, it is an indication that the cell has high acid. To correct a condition of this kind, place the battery on charge and when the specific gravity rises to 1.300, or whatever is recommended by the manufacturer, draw off a portion of the electrolyte from the cell with the hydrometer syringe and replace with pure distilled water.

Continue this process of charging, removing electrolyte and replacing with distilled water until the specific gravity ceases to rise for a period of time ranging from 1.5 to 2 hours, the specific gravity at this time testing 1.300, or as otherwise specified.

A very low voltage reading when a cell is tested usually indicates that the cell is dead (completely discharged) or has an internal short-circuit. To test the voltage of a cell when it is delivering no current usually gives a comparatively high voltage whether the cell is fully charged or half-charged. Voltage tests, therefore, should be made only while the cells are discharging.

In making voltmeter tests of P. B. X. storage cells, it is well to remember, especially where the voltage to be tested is so low that a very slight increase in the resistance of the testing circuit will considerably affect the accuracy of the reading, to make



Arrangement of Voltmeter for Testing Voltage of Single P. B. X. Storage Cells.

certain that the place on the cell terminals selected for the voltmeter contact points is clean and bright. Even a thin film of dirt or a weak contact will increase the resistance to a point where the test is bound to be misleading.

As a matter of fact, neither the hydrometer nor the voltmeter reading alone can always be taken as conclusive evidence of the condition of the cells. There are conditions under which one must be supplemented by the other to obtain an accurate indication of the condition of charge in a complete P. B. X. storage battery.

First Airport Telephone Booth Installed in Oakland, Calif.

To meet the demand of air passengers, pilots, and others for convenient communication at the Oakland, Calif., airport, a special four-compartment booth has been developed by the Pacific Telephone & Telegraph Co.

The new booth is unique because it has these four sound-proof compartments under one roof. Each compartment is slightly larger than the usual telephone booth and is built to shut out sounds of airplane motors and talk from the other compartments. Each has its own door. The booth is located in the open, near the landing field.

Airport telephones usually are installed in hangars and used only by airline companies in their own work. With an air-minded public and greater air travel, public telephones are as necessary at flying fields as at railroad stations and steamship terminals.

The outside walls of the booths are blue with a white sign, "Public Telephone." The white roof carries on its two sides five-foot blue telephone emblems easily seen from the air or ground.

The Oakland municipal airport is the first in the country to have this new type booth. The company plans similar equipment at other airports on the Pacific Coast.

Advertisement Tells Story of 25 Years of Progress.

A recent issue of the Sunday Messenger, Athens, Ohio, was given over to articles commemorative of 25 years in Athens. A full-page advertisement entitled, "The Story of 25 Years of Progress by an Athens Home-Owned Utility," was run by the Athens Home Telephone Co., of which Dr. C. L. Jones is manager.

The advertisement was illustrated with photographs showing the three buildings occupied by the company in Athens during the past 25 years and the buildings in Amesville and Albany, together with a view of the lamp signal switchboard installed recently in the Albany exchange. Illustrations of the monophone set and dial were also presented.

"For more than 25 years," the text matter read, "the telephone system and service of Athens has been owned by its business people very largely. When improvements and expansion were advisable, the company's 175 stockholders very agreeably backed the situation by furnishing the necessary money. The 'customer owned' plan of promotion and development has proved popular with many utility concerns.

"Many years ago it became apparent that efficient local service was not all to be required of a communication system. Therefore, the Athens Home company negotiated an arrangement with the Ohio Bell Telephone Co. by which it became its authorized local representative in the originating and handling of all long distance messages for it and the American Telephone & Telegraph Co.

The business interests of Athens realize there has been fully as much as or more improvement in recent years in long distance service than there has been in local. Ample circuit facilities have been provided so that many of your intercity calls are handled promptly without having to hang up your receiver. A telephone call is equivalent to two telegrams at about the same price. The telephone service in Athens county was never more severely taxed than during the recent mine disaster.

The accompanying cuts readily indicate the endeavor made over a period of years to secure suitable housing for the central office equipment, to the end that the present, thoroughly fireproof exchange building in Athens has forever removed a hazard in case of fire for its business institutions, especially its wholesalers. No telephone service, little business!!"

At the top of the advertisement, a reproduction of a plaque awarded a year ago by the Ohio Independent Telephone Association in recognition of outstanding advancement in plant and service is shown.

For Business or Pleasure, Let Your Voice Take You There.

The Chesapeake & Potomac Telephone Co. last month commenced a campaign in Virginia for greater usage of out-of-town telephone service. The elements of the campaign are described by J. A. Cummins, Virginia sales supervisor of the company, in the current issue of The Transmitter, the employes' monthly magazine.

In order to reach both the business and residence markets, it was necessary to draw up two separate plans, as the method of approach to these two markets is entirely different. The plan as applied to business customers is as follows:

The managers in the ten largest cities selected a list of 10,000 business customers whom they thought were actual or potential long distance users. A series of four letters, which outlined the many advantages in using out-of-town service in business transactions, were mailed to these customers—one each week for a period of four weeks.

One week after the last letter was mailed, trained saleswomen started calling these customers for the purpose of discussing out-of-town service. The conversation with the customer was opened with the statement that the company would be more than glad to supply him with an attractive little booklet which could be used for listing his out-of-town numbers, and that if he would furnish it with a list of such numbers, it would enter the information in the booklet and mail it to him.

If the customer would not furnish such a list, an offer was made to mail him the blank booklet so that he could use it in compiling his own list. Any information the customer desired in connection with long distance service was furnished by the young woman who did the calling.

SAFETY DOCTRINES.

By John A. Bracken.

Attitude.

To work safely in the telephone plant depends entirely upon the attitude of one's mind. If one thinks safety, he will work safely.

It is the idea that one entertains regarding the importance of safety that really counts.

It is believed that a considerable increase in long distance calling will result from this plan of mailing four specially-prepared letters and making a telephone call to a select list of 10,000 business customers.

An entirely different plan was used in an effort to reach the residence market, as here it is necessary to reach a large number of people at a reasonable cost. A series of 15 advertisements, featuring out-of-town rates to certain selected points, was prepared and one run every other day in 17 daily papers located in the 10 cities which were selected for this campaign.

This series began with an advertisement which included a list of points that could be called for 35 cents or less; the second one featured points reached for 45 cents or less, and so on through the series, the rate increasing with each advertisement.

This advertising campaign was supplemented by a series of 30 100-word radio announcements which were given out daily from the broadcasting stations at Richmond, Norfolk, Roanoke, and Alexandria, and every other day from the station located at Lynchburg.

In these announcements, an attempt was made to illustrate the many uses which people are finding for out-of-town telephone service; and it was pointed out that the many improvements in this service have made it almost as fast and clear as local service. Also the point was stressed that the telephone is the quickest, easiest, cheapest, and most satisfactory method of communication.

As the telephone company says, "For business or pleasure—let your voice take you there."

Pole Strengths Adopted by American Standards Association.

New American standard values for the strength of wood in the form of poles are announced by the American Standards Association, New York, as follows: Creosoted southern pine, 7,400 pounds; chestnut, 6,000 pounds; western red cedar, 5,600 pounds, and northern white cedar, 3,600 pounds per square inch.

Under the provisions of the National Electrical Safety Code the new values automatically replace the old figures of 6,500 pounds for dense yellow pine, and 5,000 pounds for other yellow pine, chestnut and western red cedar, that have been in general use by pole line engineers. Northern white cedar remains unchanged.

The new standards are the result of an extensive study conducted by the Association's sectional committee on wood poles. The committee was organized in 1924 under the sponsorship of the telephone group, embracing the Bell system and the United States Independent Telephone Association. The chairman of the committee is Dr. R. L. Jones, director of apparatus development, Bell Telephone Laboratories, New York.

A partial list of the membership of the committee includes representatives of the American Telephone & Telegraph Co., the United States Independent Telephone Association, the Western Union Telegraph Co., the Postal Telegraph-Cable Co., the National Electric Light Association, the American Institute of Electrical Engineers, the American Railway Association, the American Electric Railway Association, the American Society for Testing Materials, the U. S. Bureau of Standards, the U. S. Forest Products Laboratory, the American Wood-Preservers' Association, the Western Red Cedar Association, the Northern White Cedar Association, and other pole producers.

The public utilities of this country require annually a total of approximately 4,000,000 poles, southern pine, cedar and chestnut. The agreement among the representatives of the groups mentioned as to ultimate fiber stresses for poles marks an important step in standardization practice in the United States.

Bell Pay Stations in Pennsylvania Lose Directory Listing.

Places where public telephones, or pay stations are located, will not be listed in coming issues of the telephone directories of the Bell Telephone Co. of Pennsylvania unless proprietors of places where the telephones are placed accept a new type of service, it has been announced. The new rule will go into effect throughout the state if preparatory plans are carried out.

Telephone company representatives are calling on the 3,000 places where there are public telephones in Allegheny County, explaining the new plan and offering persons now having such telephones a semi-public or semi-subscriber class of service which will give a directory listing.

The new type of service, designed for joint use by transient public and subscriber, will be given if the proprietor of a place where a pay station is located will guarantee a revenue of five calls daily. This will give a directory listing and make incoming calls possible.

"Providing a directory listing on a public telephone, as we have been doing, gives the agent incoming service without his actually paying for it," William Bradford, Pittsburgh division manager, said. "This involves discrimination in that other subscribers pay for incoming as well as outgoing service."

Pole Fittings.

Fig. 1 shows the standard crossarm arrangements and hardware for toll and rural leads.

There are two classes of crossarms, which are referred to as "pony" and "standard" arms. The pony (2¾ ins. by 3¾ ins.) is used for local exchange and for light rural leads. The standard crossarm (3¼ ins. by 4¼ ins.) should be used on heavy rural leads and important toll leads.

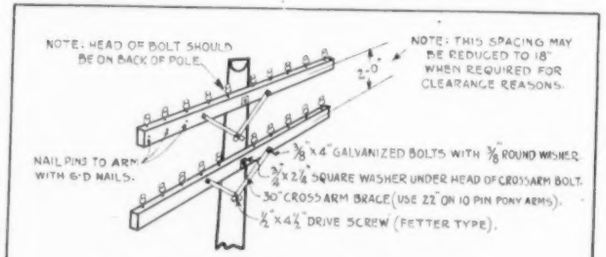

NOTE: HEAD OF BOLT SHOULD BE ON BACK OF POLE.
NOTE: THIS SPACING MAY BE REDUCED TO 18" WHEN REQUIRED FOR CLEARANCE REASONS.
2'-0"
NAIL PINS TO ARM WITH 6-D NAILS.
⅜"x4" GALVANIZED BOLTS WITH ⅞" ROUND WASHER.
⅜"x2¼" SQUARE WASHER UNDER HEAD OF CROSSARM BOLT.
30" CROSS ARM BRACE (USE 22" ON 10 PIN PONY ARMS).
½"x4½" DRIVE SCREW (FETTER TYPE).

FIG. 1. STANDARD CROSSARM ARRANGEMENT.

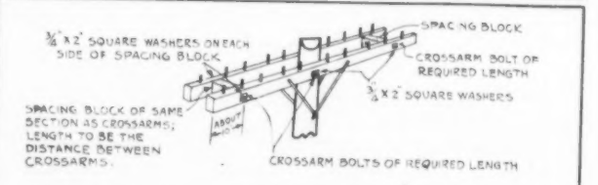

⅜"x2" SQUARE WASHERS ON EACH SIDE OF SPACING BLOCK.
SPACING BLOCK
CROSSARM BOLT OF REQUIRED LENGTH
⅜"x2" SQUARE WASHERS
SPACING BLOCK OF SAME SECTION AS CROSSARMS; LENGTH TO BE THE DISTANCE BETWEEN CROSSARMS.
ABOUT
CROSSARM BOLTS OF REQUIRED LENGTH

FIG. 2 DOUBLE CROSSARM FOR POINTS REQUIRING EXTRA STRENGTH.

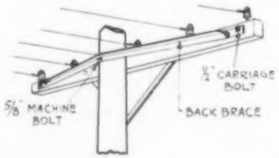


FIG. 3. BACK BRACE

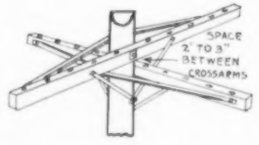


FIG. 4 BUCK ARM CORNER.

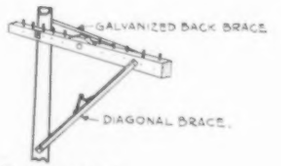


FIG. 5. ALLEY ARM

If the ultimate number of wires to be carried by a lead is four, then brackets should be used. If six wires will be the ultimate load, a six-pin pony arm should be used, and with more than six wires a ten-pin arm.

Poles should be gained for the ultimate number of crossarms to be carried, before erection. Creosoted pine poles are always gained at the pole plants before being creosoted, for the ultimate number of gains.

On joint-use leads a special crossarm having a spacing of 32 inches between the pole pair pins and reduced spacing between the other pins should be used. The purpose of this arm is to provide adequate climbing space for a power lineman climbing up through the pole pair.

Fig. 2 shows the use of double crossarms at dead-end points, railroad crossings, and extra long spans. The crossarms may be fastened rigidly together near their ends, either by double-arming bolts or by wooden spacing blocks made from old crossarms. The double-arming bolts do not give quite as substantial construction as the spacing-block method.

Instead of double-arming it is sometimes feasible to use galvanized steel back braces to serve the same purpose, Fig. 3. Their use on heavy dead-ends is generally not advisable. They are suitable in places requiring double arms but with less strain than is found at dead-end points.

Buck-arming construction for use where two pole corners cannot be made, is shown in Fig. 4. This form of construction is to be preferred to the practice of placing arms

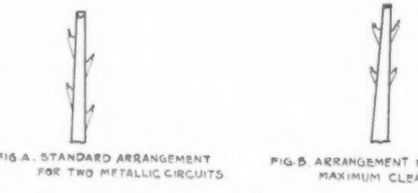


FIG. A. STANDARD ARRANGEMENT FOR TWO METALLIC CIRCUITS.

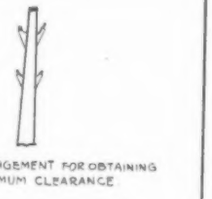


FIG. B. ARRANGEMENT FOR OBTAINING MAXIMUM CLEARANCE.

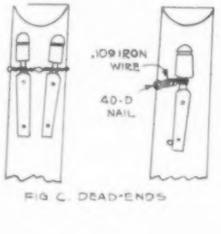


FIG. C. DEAD-ENDS

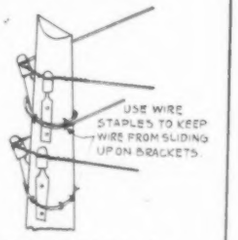


FIG. D. BRACKETS AT CORNERS.

FIG. 6. BRACKET ARRANGEMENT.

at regular spacing on corners. Fig. 5 shows the arrangement for alley arms. Alley arms are useful where it is necessary to obtain clearance from trees, buildings, etc.

In Fig. 6 is shown the proper methods for placing brackets. There is a variety of ways in which brackets may be located on a pole. The main factors in deciding which is the best method are: They should be located so as to minimize short-circuits and crosses, and so as to give proper ground clearance.

Where only a single pair of wires is carried on a pole line and there is little probability that additional wires will be added, the two wires can be located three or four feet apart, so long as proper ground clearance over driveways, entrances to fields, etc., is given. This practice of wide spacing greatly reduces the trouble due to short-circuits and offers some transmission improvement due to the lower capacity between wires. It is vitally important that adequate vertical clearance be provided between the lowest telephone conductor or cable and the ground. The state laws or rules of state regulatory bodies having jurisdiction over telephone companies usually specify clearances. The following clearances are suggested in the absence of such rules: Over highways, 20 feet; over steam railway tracks, 27 feet above face of rail; over private driveways, 14 feet; between power wires and telephone wires, four feet, where the power voltage does not exceed 7,500.

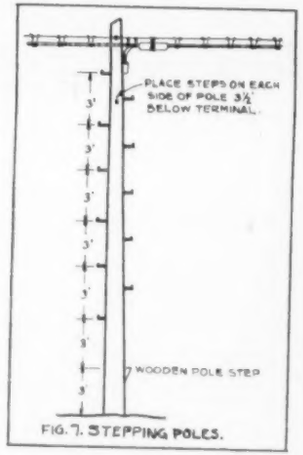


FIG. 7. STEPPING POLES.

Pole Stepping.

The method of stepping cable terminal or open-wire test poles is shown in Fig. 7. Any pole which must be frequently climbed should be stepped. In placing iron pole steps, drill a half-inch hole about 2½ inches deep in the pole and drive the step in until about 5¼ inches of step protrudes from the pole.

Pole Guying.

The subject of guying is an important one and every telephone man connected with construction work should be familiar with the fundamental principles of guying. Improper guying may result in expensive line breaks during storms, cable slacking off, and a poor appearance of the plant in general.

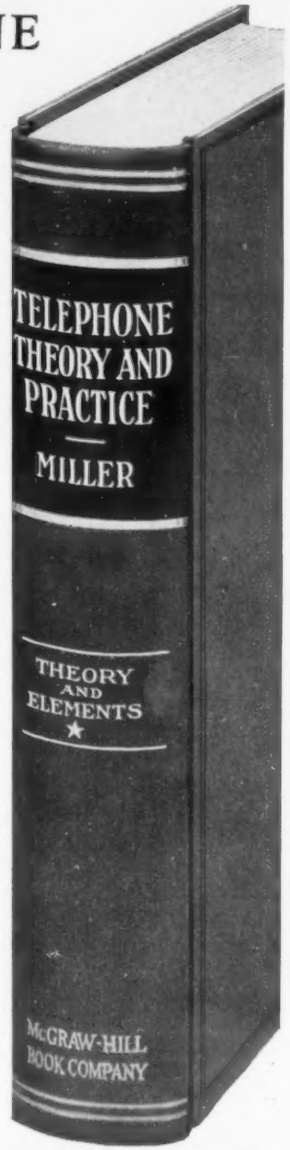
There are two classes of anchors—those known as "patent anchors" and those improvised from available materials around the pole yard and exchange.

TELEPHONE THEORY and PRACTICE

Theory and Elements

by **Kempster B. Miller**

Fellow, American Institute of Electrical Engineers; Member, Western Society of Engineers; Author of American Telephone Practice, 1904, and Joint Author of Telephony, 1912.



Here is a book that comprehensively covers those introductory and theoretical elements of telephony needed for study and reference by workers in all stages of the profession. It is written by an authority; a man connected with practical telephony for more than thirty-five years. Although the first volume of a three-volume series, this book, Theory and Elements, represents an independent, complete and up-to-date treatment of its subject. A thorough groundwork in the background and principles of telephony is given, which will serve:

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2. The more advanced telephone worker who is specializing in some particular phase of the industry and who may wish to see more clearly how his job is related to the rest of the business.
3. The general technical reader who is interested in the broad phases and general workings of the industry.
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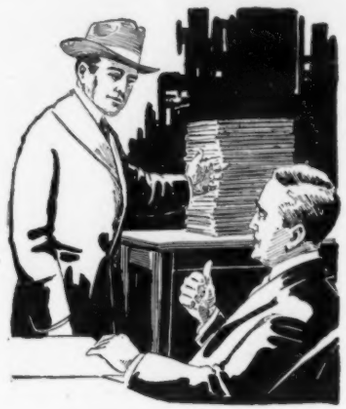

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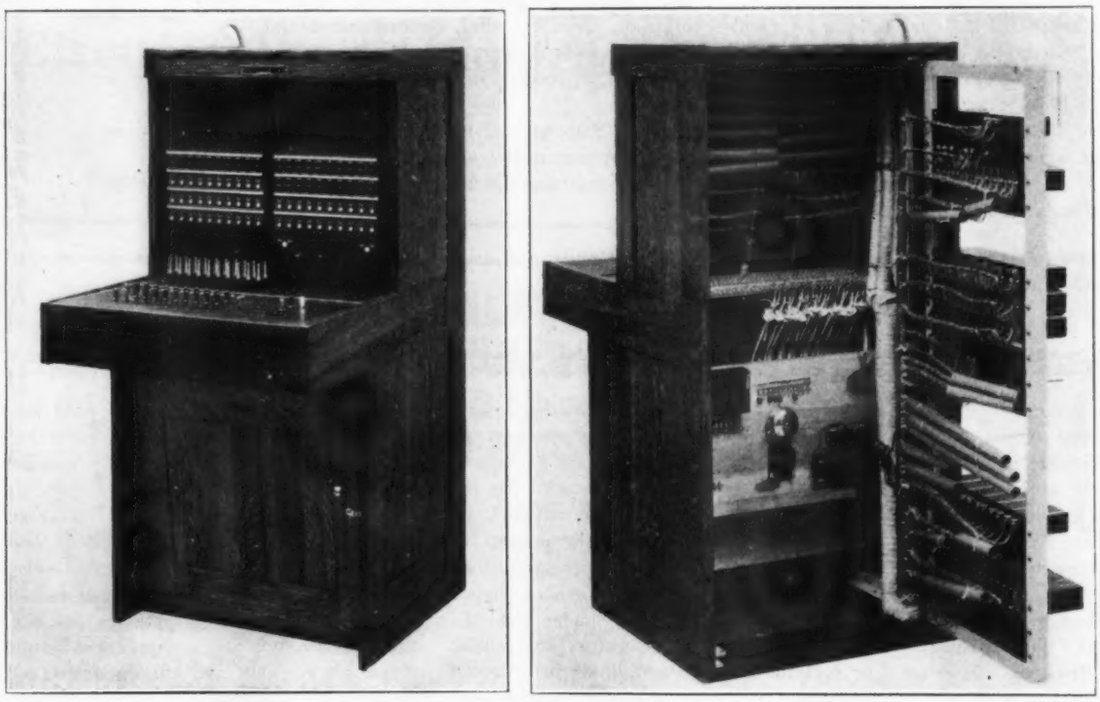
Magneto Board With Lamp Supervision

Stromberg-Carlson's New Lamp Line Magneto Switchboard Placed on the Market—Advantages and Features of the New Board—Two Types of Line Circuits—Cord Tone Test Circuit for Keeping Cords and Plugs Up to Standard

By E. G. Eidam,

Assistant Chief Engineer, Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y.

One of the features at the convention of the Illinois Telephone Association and the Missouri Telephone Association was the new lamp line magneto switchboard displayed by the Stromberg-Carlson Telephone Mfg. Co. Realizing the general trend for this type of equipment the Stromberg-Carlson company has designed and placed on the market one of the most outstanding magneto boards equipped with lamp supervision. The board attracted unusual attention throughout the two conventions and especially did chief operators, plant superintendents and traffic officials highly praise the equipment.



Front and Rear Views of Stromberg-Carlson's New Lamp Line Magneto Switchboard.

The principal advantages of this switchboard are: more positive line signal, more positive cord circuit clear-out, more positive code ringing indication due to flashing lamps, common battery type of operator's circuit with constant high transmission efficiency, and better general appearance, which should cause the purchaser to have additional pride of ownership.

These features make for better service to the subscriber, for the lamp signals demand quicker attention, not only in answering incoming calls, but in observing the clearing-out signal which on the ordinary type of board is somewhat obscured.

The cabinet is the same as the one housing the popular Stromberg-Carlson junior multiple equipment, with the exception that the relay gate is higher. Individual jacks permit replacement on lines receiving the most service, without disturbing others and also make it a simple matter to add more lines.

The power plant consists of either a half-ampere tungar or a one-ampere dry plate rectifier, which is plugged directly into a line receptacle, the output circuit being attached permanently to the battery fuses. The battery is the enclosed type of small capacity with indication in the pilot cell to show the gravity condition of the battery.

For single-party straight-line ringing use, the Telering is used. This also is connected directly into a line circuit receptacle, so that no power board is needed in connection with the installation of the board.

Two types of line circuits are in this board; one for short city lines, which are primarily for single-party service, and the other for heavily-loaded rural service designed to indicate code signaling. Code signaling is not required for the short city lines.

The short line circuit consists of a No. 190 type relay, double-wound ring-up, lock-up type and is very efficient in operation from generator current. Both the jack and the lamp socket used with this line circuit is of the individual type. The signal to the operator is the lamp signal type, a standard telephone switchboard lamp being used. The lamp is covered with a standard opalescent lamp cap. Each line is arranged with a sliding designation strip so that proper line designation can be used.

The long line circuit consists of two No. 200 type relays arranged in the circuit so that the lamp signal can be used as a code call, indicating to the operator that the station calling is calling another station on the same line. All that is necessary for the operator to do is to release the line signal by plugging in.

The cord circuit is of the non-ring-through repeating coil condenser type. The clear-out signaling equipment is accomplished by means of two No. 200 type relays of the ring-up lock-up type and two lamps per cord circuit. The plugs and cords are of the two-conductor type. The key equipment consists of a single ring-back key for ringing on the back cord, and a combined ringing and listening key for ringing on the front cord and also listening or talking across a circuit by the operator. The operation of the listening key not only connects the operator circuit, but releases or opens the cord relay locking circuit, which puts out the cord clear-out lamp signal.

The first two cord circuits are arranged with repeating coil cut-out keys and a separate key per cord circuit is used. This is used when through long distance connections are established so that minimum losses are introduced at the switching point. Single-lamp clear-out is obtained under this condition.

NEW YEAR'S RESOLUTIONS

By Miss Anne Barnes,

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

As we stand at the beginning of a new year we resolve not to spoil one white, clean page of the 365 before us. We shall be less selfish, more considerate of others, put more effort into our daily tasks, and what not.

Into the midst of such thoughts stalks this disturbing one: "Will we? We hoped to do all these things at the start of last year."

We turn then and look back over the old. What a blotty record many of these pages record. Many of the good resolutions we have made have met with varying fates. How few we kept. Only the easy ones, I fear. And perhaps the ones that did not call for much sacrifice. Some we abandoned because we later changed our viewpoints; a sign of growth, I believe. Open mindedness results in broadened vision. Not every little bud on a bush becomes a blossom. Some die to make room for others. And many soon die, like our good resolutions, for apparently no reason at all.

On the whole, are we better or worse because of those unfulfilled resolutions back in 1930 or any other year? That depends.

Some years, we can remember ourselves as saying: "I shall make no resolutions whatever, for I am sure to break them." And so we didn't make any. We should, however, for resolutions are objective points we hope to attain during the new year. So make them. We will be better for it.

We are likely to find, as we go on from day to day, that some of our resolutions clutter our programs, especially those on which we later change our viewpoints.

We always start the new year buoyantly, at the boom of the first gun; the ringing of the first bell. We start out with a measure full to over-flowing of good resolutions, some essential, some non-essential.

So, in our backward turning, let us not "cry over spilled milk." Let us look happily forward because of the opportunity to start another year. This in itself should be enough to start us off with renewed desire to make the year 1931 better than any previous year.

And above all else, the important thing to remember is, that we must continue to make good resolutions every year for, after all, it is not our accomplishment, but our continual trying that helps us the most.

MORAL: This is the philosophy of the Mother Bird in teaching her little ones to fly.

A New Year's Thought:

"Life is short—too short to get everything. Choose you must, and as you choose, choose only the best—in friends, in books, in recreation, in everything."

The operator's circuit consists of the well-known anti-side tone type and is arranged for high efficiency monitoring when the operator must observe a connection that is on toll or long distance. With the use of this circuit, minimum loss is introduced into the connection when the operator is observing. The cutting-in of this circuit is accomplished by means of a common key per position. This feature is required by the long distance operating companies.

A hand generator is included in the switchboard for emergency ringing purposes. It is controlled in and out of the circuit by means of a common generator switching key, switching from power to hand generator.

The night-alarm circuit consists of a vibrating bell, controlled from a common night-alarm relay which operates from the lamp signals in the line circuits or from the cord circuit clear-out lamps. The control of the bell circuit is by means of a night-alarm key common to the position. In the face of the switchboard there are two jacks to which an artificial network, representing approximately 20 db, is terminated. The operator can connect up any line through the cord circuits and cut this network in and out while making transmission tests to determine whether the transmission is up to standard.

Two jacks per position are used for the cord tone test circuit. The network of this test circuit consists of the proper resistance coils, induction coils and tone buzzer in order that a tone can be placed through the cord and plug under test. In making the test, the operator must shake or pull the cord up and down in order to determine the break or circuit interruption. Telephone engineers believe that this circuit is invaluable in keeping cords and plugs up to standard.

A common key per position is used to control the battery-operated harmonic converter. In telephone plants requiring this type of equipment, it is not necessary to operate the converter 24 hours per day; and by this method the converter can be operated from the switchboard, thus economizing in battery current.

T. De Witt Talmage, transmission engineer of the Illinois Telephone Association, after inspecting the new Stromberg-Carlson switchboard at the convention of the Illinois Telephone Association made the following statement in a letter:

"It has always been my contention that the subscriber's most impressive and lasting opinion of telephone service is obtained from the manner in which he first hears the operator. In other words, one of the greatest aids to good public relations, although many telephone men do not realize it, is an operator's circuit and headset which delivers a constant and satisfactory volume of transmission. The use of storage battery operator's equipment which supplies a constant and efficient current to the operator's transmitter should be used in every magneto switchboard.

In regard to the transmission testing features in your new magneto switchboard, it is my opinion that these testing circuits are just as essential in the make-up of the modern magneto switchboard as cord circuits. Of course, it would be absurd to build a switchboard without provision for switching circuits; and it is just as incomplete designing to omit the necessary testing circuits which are used to determine the condition of the cord circuits and the subscribers' lines from the standpoint of clear and distinct telephone conversation.

For these reasons it was indeed gratifying to learn that these advancements in switchboard equipment have been incorporated in your new lamp signal mag-

TELEPHONE WIRES & CABLES

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This Inductor Type Tone Generator produces an A. C. current with a smooth wave form, which does not spread easily to adjacent conductors or circuits.

It is designed for general use, for the production of busy, dial, trouble, and howler tone currents.

There are no slip rings, commutators, or contact brushes.

The oiling arrangement is such that a slight amount of oil, once a month, keeps it lubricated; consequently it requires very little attention.

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Group of Those Present at Meeting of Southwestern Division of Indiana Telephone Association at Terre Haute.

neto switchboard. There is no question that the intelligent use of these features will tend to raise the grade of magneto telephone service. Furthermore, in lifting magneto service areas out of the class of mediocrity into that state where good telephone service is a reality, instead of a possibility, it will be absolutely necessary that such transmission testing features be standard equipment and used in a routine manner."

Meeting of Division of Indiana Association at Terre Haute.

A meeting of the southwestern division of the Indiana Telephone Association was held in the main building of the Citizens Independent Telephone Co. at Terre Haute on December 3. Representatives of the companies at Paris, Bloomington and Marshall, Ill.; Greencastle, Sullivan, Princeton, Rosedale, Clinton, Brazil, Crawfordsville and Indianapolis, Ind., comprised the Citizens company's guests at this gathering.

In the morning a transmission test demonstration was given by A. L. Stadermann, engineer of the Citizens Independent Telephone Co., and J. W. Quinlan, division transmission engineer of the Indiana Bell Telephone Co., assisted by S. B. Dibble, superintendent of maintenance, and P. Gremillion, assistant division transmission engineer of the Indiana Bell Telephone Co.

A separate morning session for the traffic division was in charge of Mrs. Mary Gfroerer, traffic supervisor of the Citizens company. It consisted of open discussion on relations between toll centers and tributaries and other matters pertaining to that particular phase of the business. Prominent among those taking part in this discussion were J. Lloyd Wayne, general toll supervisor, and T. D. Dial, district traffic superintendent, of the Indiana Bell company.

At noon a group picture was taken in front of the telephone building and from there the gathering went to the Terre Haute House for lunch. No program followed the luncheon. Hart Farwell, president of the Citizens company, presented each of the ladies with an American Beauty rose and passed cigars to the men.

In the afternoon there was a joint session of all divisions with Bernard T. Gault, commercial manager of the Citizens company, as chairman. A playlet entitled "The Reformation of Mazie" was presented by members of the sales department of the Indiana Bell Telephone Co. at Indianapolis, after which a general discussion took place. This included short talks by T. C. Ainsworth, manager, Kinloch-Bloomington Telephone Co., Bloomington, Ill.; E. L. Hamlin, district commercial superintendent; Russell C. Rottger, vice-president, and D. H. Whitham, general contract agent, Indiana Bell Telephone Co., Indianapolis; W. H. Beck, secretary, Indiana Telephone Association, and John Harbaugh of the Sullivan Telephone Co., Sullivan.

At the close of this discussion, J. G. H. Klinger, manager, Citizens Telephone Co. of Clay county, Brazil, and president of the southwestern district of the Indiana Telephone Association, held a short business meeting for this district of the association. Following this meeting the visitors were taken on a tour of the main building of the Citizens company. One of the high spots of this tour was an explanation and demonstration of the most up-to-date accounting practices in the accounting department by Auditor S. T. Vancleave.

This tour ended the day's activities and the company's guests were on their way home by 5 p. m., having declared the meeting highly successful from every angle.

State Association Executives Meet and Plan Future Activities.

Following out the agreement at the recent meeting of the executives of state telephone associations in Chicago last October, the United States Independent Telephone Association called a meeting of the secretaries of the state associations last week. It was held at Hotel President, Kansas City, Mo., on December 16, morning, afternoon and evening sessions being held.

The main topics discussed were uniform bulletin service and cooperative programs between the national and the state organizations for promoting the getting of more business by the Independent companies.

It was decided to have detailed studies made of the possibilities of uniform plant bulletins to be submitted at the next meeting of the state association executives in the spring of 1931. The studies are to be made by A. L. Stadermann of Terre Haute, Ind., chairman of the plant division of the United States Independent Telephone Association.

It was also agreed that the national organization would occupy one session at state associations' conventions for presenting, through special speakers, discussions of new subscriber campaigns, obtaining of additional revenue through special services, etc.

Those attending the meeting were F. B. MacKinnon, president; C. C. Deering, secretary, and A. L. Stadermann, chairman of the plant division of the United States Independent Telephone Association; J. C. Crowley, of St. Paul, Minn.; Thos. Phalen, Aberdeen, S. D.; George M. Kloidy, Lincoln, Neb.; R. W. Hedrick, Jefferson City, Mo.; A. R. MacKinnon, Topeka, Kans.; H. W. Hubenthal, Oklahoma City, Okla.; R. A. Lumpkin, Mattoon, Ill., president, and A. J. Parsons, Springfield, Ill., secretary-treasurer, Illinois Telephone Association; and R. B. Still, Kansas City, substituting for L. S. Gardner, president of the Texas association.

Canada to Have Direct Telephone Service to London.

Canadian requests for direct telephone service with London, in place of the present facilities via New York, are favored in a report by the British Postmaster General in the House of Commons, according to Canadian advices forwarded to the U. S. Department of Commerce by Commercial Attache Lynn W. Meekins, at Ottawa.

Although the British Post Office had informed Canada that the present route provides more reliable service than the direct arrangement can be expected to furnish, the British authorities will carry out the wishes of the Dominion and the new direct service will be opened within the next few months, the report states.

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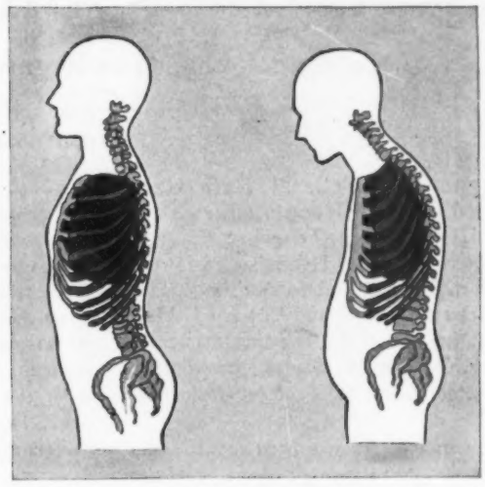

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NOTE the capacity of the lungs, indicated by black, at the left. Compare this with the figure at the right where lung capacity is seriously diminished by improper posture such as telephone operators, clerks and executives assume through wrong seating. Poor oxygenation of blood follows; fatigue sets in; blood is not supplied to the brain tissues at normal rate; mental alertness and power are lost.

Seated in an adjustable Do/More which is fitted to you individually by a Do/More seating expert—just as your clothing and shoes are fitted—you automatically assume correct posture. You avoid the many evils of poor posture which rob you of physical vigor. You gain new power for your daily tasks.

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Remember there is a Do/More Health Chair for every seated occupation in the telephone business. Here is a Do/More Telephone Operator's model with upholstered back. It is adjustable both vertically and laterally and has a wood and cane combination, form-fitting seat. A special feature makes the back rest instantly adjustable to the occupant.

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Gentlemen: Please send me further details on the proved efficiency of the chair installations you have made in the telephone field, together with your scientific treatise on the benefits of correct posture at work.

What the Commissions Are Doing

Up-to-the-Minute News Regarding the Activities of State and Interstate Commissions, Courts and City Councils in Matters Concerning Telephone Companies—Summary of Commission Orders and Schedule of Telephone Hearings

Michigan Bell Federal Rate Case Ordered Reopened.

The Michigan Bell Telephone Co. rate case was reopened on December 15 by the decision of Federal Judges Arthur J. Tuttle, Charles C. Simons and Edward J. Moinet, who instructed the standing master in chancery, William S. Sayres, Jr., to take new testimony and to file a supplementary report.

In this report he is instructed to take into consideration the recent decision of the United States Supreme Court in the Illinois rate case to the extent that it applies to the Michigan case.

The petition for a reopening of the case was presented by Harold Goodman, special assistant attorney-general, representing the Michigan Public Utilities Commission. His petition was based on the United States Supreme Court decision in the Illinois case, which was written by Chief Justice Charles Evans Hughes.

In January of the present year, Master Sayres made his report, recommending that the utilities commission be permanently restrained from compelling the telephone company to reduce its rates as ordered in January, 1926.

In supplemental hearings, the master in chancery reaffirmed his recommendations and his findings were upheld November 26 last in an opinion by the federal judges.

Reopening the case means passage of many months before a new report is ready. In the meantime the rates which the Michigan Bell company protests are too low will remain in effect.

Meanwhile the Michigan Public Utilities Commission has started a new fight for a rate reduction by ordering officials of the telephone company to show cause why existing rates should not be reduced.

Kansas Considering Advisability of Investigating Bell Rates.

The engineers for the Kansas Public Service Commission have begun gathering information on the cost of materials for the Southwestern Bell Telephone Co. plant in that state. The engineers were started on the work following a letter to the commission written by Governor Clyde M. Reed. If the information developed warrants, the commission will order a general investigation in the telephone rates throughout the state, looking to a downward revision.

In his letter to J. W. Greenleaf, chairman of the commission, the governor stated that rates fixed eight or ten years ago on a basis of peak price valuation are still in effect. In the meantime, he asserted, "commodity prices and operating costs have been substantially reduced," in some instances as much or more than 50 per cent.

The telephone investigation follows closely on heels of litigation directed against the gas and pipe line interests. Both proceedings will carry over for final action under the administration of Harry Woodring, Democrat, who succeeds to the governorship next month.

Oregon Commission to Investigate Present Telephone Rates.

Business depression, the present low cost of money and supplies, installation of automatic dials and reduction of the percentage of gross revenue paid to the American Telephone & Telegraph Co., are assigned by the Oregon Public Service Commission as reasons for ordering an investigation of the rates of the Pacific Telephone & Telegraph Co., which have been in effect since 1924.

In a separate proceeding the commission ordered an investigation of the same company's charges for telephone service to hotels outside of the city of Portland.

Commission Order Set Aside; to Appeal to Supreme Court.

An appeal to the Wisconsin Supreme Court, at the January session will be made by the officials of the Ontario & Wilton Telephone Co. in their case against the Union Co-operative Telephone Co., of Wilton, it was announced on December 10 at Sparta.

In the case in question, the Union company applied to the Wisconsin Railroad Commission for authority to operate. The commission, in a ruling issued August 30, 1930, denied the certificate of public convenience and necessity for which the co-operative organization applied. The Union company appealed from this order

Circuit Judge A. G. Zimmerman on December 8 at Madison held that where a telephone company has lost most of its business over a period of three years the railroad commission should not hesitate to grant a new company a permit to operate.

The commission denied the right to operate to the Union Co-operative Telephone Co., Ontario. The Ontario & Wilton Telephone Co., which operated in the territory, had its list of subscribers drop from 440 to 65 in three years.

Judge Zimmerman declared that, although the statutes and court decisions declare the public policy to be to avoid having competitive public utilities operating in the same territory, he must intervene in this case to set aside the commission's order.

"Is it or is it not unreasonable for the commission under the circumstances of this case to refuse the people of the community involved the right to establish a telephone service and management of their own choosing, after it has been clearly shown by a record of about three years that the great bulk of the community has lost confidence in the management and service of the established company both as to its past actions and future prospects, to such an extent that, although they desire and earnestly plead for telephone service, three years ago of the 440 subscribers all but about 65 withdrew from the operating company as subscribers and have persisted in their withdrawal during a period of three years?" the judge asked.

"It would seem that if there is any vitalizing material left in the present operating company, the entrance of a competitive company might aid its rehabilitation; and if it must lose by reason of the entrance of a competitive company, it can only have itself to thank for so conducting its business as to lose the confidence of the community and as to require the entrance of a competitor, in order to satisfactorily serve such community."

Decision in Chicago Case Changes Aspect of San Antonio Case.

Judge Edwin R. Holmes, who recently expressed the opinion in the rate case of the city of San Antonio, Texas, that "the exceptions to the master's report be overruled and a decree entered in accordance therewith," has given further consideration to the case.

In a letter under date of December 8, Judge Holmes wrote the city attorney of San Antonio in part as follows:

"I have read a copy of the decision of the Supreme Court of the United States in the case of Illinois Commerce Commission vs. Illinois Bell Telephone Co. It occurs to me that in view of this recent announcement the San Antonio case should be referred back to the master for further consideration and findings."

Argue Against Proposed Indiana Service Connection Charges.

Representatives of Indiana telephone companies expressed opposition on December 17 to the Indiana Public Service Commission's proposal to reduce charges for installing telephones and other services. A substitute scale of service connection

The Public Wants Service You Want Revenue

Both are satisfied when you install Churchill Telephone booths. Your city has many appropriate places where booths can be located advantageously.

Churchill booths are attractive. They invite patronage and make satisfied customers for YOU. Easy to open and close, well ventilated, furnishing the privacy of conversation the user is entitled to.

Our engineers will be happy to work out plans for the suitable location of booths in your territory. Let us assist you to increase your revenue during 1931.

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charges was proposed for the one made by the commission in a preliminary order.

Retention of the present fee for installing business telephones was urged, but reductions in other installations were acceded to. Principal argument for the companies was presented by B. G. Halstead, attorney for the Indiana Bell Telephone Co.

The company representatives urged that there be no reduction from the present $3.50 charge for installing business telephones. The commission proposed a cut to $2. The companies would agree to a $2 rate for installing residence telephone, except at smaller exchanges, where $1.50 would be agreeable, according to Mr. Halstead. Retention of a 50-cent fee for all reconnections was asked.

Summary of Commission Rulings and Schedule of Hearings.

ALABAMA.

December 7: Rogersville Telephone Co. ordered to begin work immediately upon the rehabilitation of its properties to place the exchange in Rogersville in good condition and adequately repair the toll line from Rogersville to Athens.

The order was entered on a citation of the commission, and followed a hearing at which numerous complaints were made alleging inadequate service. The commission fixed the time limit at 90 days for the rehabilitation program.

The company was also ordered to place its records in proper shape in keeping with the rules of the commission.

CALIFORNIA.

December 15: West Coast Telephone Co. authorized to abandon farmer telephone lines between Ager and Dorris and between Prather Ranch and Montague, Siskiyou county.

December 15: Southwestern Home Telephone Co. applied for a certificate of public convenience and necessity authorizing the establishment of a separate rate or zone area in the Yucaipa Valley district, which is now served as a part of the Redland exchange area of that company.

December 16: The Public Utilities California Corp. applied for authority to establish telephone exchange areas in and adjoining the towns of Adin, Modoc county, and Bieber, Lassen county, in the so-called Big Valley section, and to establish rates, rules and regulations for such service similar to those effective in other small telephone exchange areas served by the applicant.

December 17: The Pacific Telephone & Telegraph Co. applied for permission to establish exchanges and to place in effect exchange rates therefor at Lucerne and Nice, Lake county.

December 17: The Southern California Telephone Co. applied for authority to establish an exchange at Swartout, comprising the unincorporated community of that name and territory adjacent thereto in Los Angeles and San Bernadino counties. The commission is also requested to place in effect a schedule of rates similar to those effective in comparable territory in other portions of applicant's system.

December 17: The Valley Telephone Co. authorized to transfer its properties in Imperial county to the Southern California Telephone Co. for the sum of $23,000, plus the cost of additions made since December 13, 1929. The commission established rates for service in the Holtville and Brawley exchange areas of the utility approximating those in effect in similar territory

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elsewhere on the system of the Southern California Telephone Co. The new rates will result in an increase of approximately $65 per year in the aggregate.

ILLINOIS.

December 23: Hearing in Chicago before Commissioner Collins on proposed advance in rates of the Illinois Allied Telephone Co. for service in Princeton, Ladd, Ohio, Tiskilwa, LamOille, Manlius, Dover, Sheffield, Wyanet, Walnut and Spring Valley.

INDIANA.

December 30: Hearing before Commissioner McIntosh on the petition of the Fountain Telephone Corp. for authority to collect tolls for messages between the exchanges at Covington and Foster.

NEBRASKA.

December 17: Application filed by Western Telephone Corp. asking validation of a rate of $3 a year or ten cents a call, in force for a number of years with the Knox County Telephone Co. for the benefit of the latter's patrons.

December 19: In the matter of the application of the Citizens' Telephone Co., of Blair, for authority to charge $2 a month for full metallic service on farm lines Nos. 5 and 10 on its Morse Bluff exchange; it appearing that 75 per cent of the subscribers have given their consent in writing and the rate asked for being standard, ordered that application be granted as requested.

December 19: Informal complaint filed by Thedford Telephone Co. against T. P. Hamilton, operator of farm line company, alleging disconnection without notice of line used for toll purposes and connecting with Brownlee exchange.

NEW YORK.

December 16: The Cornwall Telephone Corp. authorized to issue 1,878 shares of common stock, to be acquired by the Central Hudson Gas & Electric Co.

December 17: Transfer of the Farnett Telephone Co. to the New York Telephone Co. approved. The Farnett company operates in the villages of Camillus, Amber and Otisco and in the townships of Camillus, Mercellus, Onondaga, Otesco, Spafford and Tully, Onondaga county.

The price to be paid is $24,000 plus an amount equal to any addition made to the property since August 20, 1930.

December 24: Hearing in Rochester befor Examiner J. O. O'Brien on motion of the commission as to the discontinuance of telephone service rendered to C. L. Waters of Hammondsport, N. Y., by Spencer Bailey.

OHIO.

December 6: Ohio Bell Telephone Co. authorized to put in effect new schedules revising the present boundary in territory adjacent to the city of Youngstown and reducing rates for 792 subscribers.

December 13: New Bremen Telephone Co. ordered to amend rates now being collected under bond from telephone users in New Bremen to conform to a lower schedule of rates recently compiled by the commission.

The order also called for a refund within 60 days of the difference between the rates collected under bond and those determined by the commission. This difference was said to total approximately $3,500.

OKLAHOMA.

December 29: General hearing on Cause No. 10,421 to adopt rules and regulations for connection of telephone companies.

OREGON.

December 15: Investigation ordered of rates of Pacific Telephone & Telegraph Co. which have been in effect since 1924.

SOUTH DAKOTA.

December 18: Hearing in Winfred on application of the Central West Public Service Co. for permission to increase its telephone rates in Winfred. The rates now being charged are $1.50 a month for residence telephones and $2.50 for business telephones.

TENNESSEE.

December 29: Hearing in Nashville on the rate reduction petition filed by the Citizens' Service League of Chattanooga. The order for the hearing read that "the commission is of the opinion that this case should be set for hearing in order that the matter may be disposed of as expeditiously as possible."

The petition asks for a 30 per cent reduction in the rates charged by the Southern Bell Telephone & Telegraph Co. in Chattanooga.

WISCONSIN.

December 13: Application of the Commonwealth Telephone Co. for an increase of nearly 50 per cent in its rates at its Cottage Grove exchange, approved. The new rates will become effective in January.

December 15: Approval given sale of property and assets of St. Croix Valley Telephone Exchange Co. to St. Croix Valley Telephone Co.

Condensed Telephone News

Officers of Companies Are Urgently Requested to Forward to Us Promptly All Financial and Other Statements as Soon as Issued and Any Items Relating to Construction, Rebuilding, or Changes in Their Plants and Systems

New Telephone Companies and New Incorporations.

SPRINGFIELD, ILL.—H. R. Petrick, Albert Vosberg and Frederick Kennitz, all of Varna, have obtained a charter for the Fairview Farmers' Telephone Co., a cooperative concern, to furnish telephone service in Marshall county at cost. Further plans of the mutual telephone organization will be completed within a few weeks, the incorporators announced.

MINNEAPOLIS, MINN. — The Wabasha County Telephone Co. has filed articles of incorporation with a capital stock of $50,000, highest amount of liability, $2,000.

The incorporators are Stephen E. Jones, Charles B. Howard and Merrill Buffington.

MINNEAPOLIS, MINN.—Articles of incorporation have been filed by the Empire Telephone Co., with a capital stock of $50,000, highest amount of liability, $2,000.

The incorporators are Stephen E. Jones, Charles B. Howard and Merrill Buffington.

MINNEAPOLIS, MINN. — The Douglas County Telephone Co. has filed articles of incorporation with a capital stock of $50,000, highest amount of liability, $2,000.

The incorporators are Stephen E. Jones, Charles B. Howard and Merrill Buffington.

PENDLETON, TEXAS—The Bell County Telephone Co. has been incorporated with a capital stock of $10,000. Incorporators are Clem C. Countess, A. B. Berry and Roy Harris.

Construction.

PANOLA, ILL.—The Panola Farmers Telephone Co. is faced with the problem of having a 69,000-volt power line paralleling 17 miles of its lines in Minonk and Panola townships. The high tension line being built by the Public Service Co. of northern Illinois and others will play havoc with this ground system telephone line.

Officers of the telephone company say it will cost the farmer stockholders around $100 each to change the five-wire line to the metallic system.

ROCHESTER, IND.—In order to do its share towards relieving the unemployment situation locally, the Rochester Telephone Co. has just completed considerable construction work in and about the city. This is work that was originally planned for next year but in order to help its own and needy additional employes, the company pushed the schedule ahead so that it was done this fall.

Considerable underground cable work has been done in the city while the toll lines to Kewanna, Macy and Fulton have all been renewed with new copper wire construction.

In addition, the company workers have gone over all its lines, straightened poles, tightened up wires and trimmed trees so as to give the best possible service throughout the winter.

All of this construction and improvement work has cost several thousand dollars, the officials report, and has helped several needy families for many weeks.

BONNER SPRINGS, KANS. — Plans have been completed by the Kansas Telephone

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TELEPHONE BATTERIES—*Better—by test!*
FRENCH BATTERY COMPANY—*Factory:* Madison, Wis.
General Sales Office: 20 North Wacker Drive, Chicago

Creosoted Wood Conduit
Railroad Ties, Bridge Timbers, Piles, Poles, Paving Blocks and Lumber—Manufacturers of Cross Arms, Signal Trunking and Wyckoff Conduit for Underground Wires.
The Wyckoff Pipe & Creosoting Company
Established 1881
OFFICE: 522 5th Ave., N. Y. WORKS: Portsmouth, Va.

Do you always mention TELEPHONY?—Thank you.

OPPORTUNITIES!

Rates 10 cents per word, payable in advance. Minimum charge $2.00 for 20 words or less.

"REBUILT" TELEPHONE APPARATUS

and exchange equipment saves you 30 to 50 per cent—quality and efficiency guaranteed.

EVERYTHING YOU NEED

for the installation and operation of a complete exchange—Magneto or Central Energy.

TWENTY YEARS' SUCCESSFUL OPERATION

of our "Rebuilt" Equipment Department puts it past the experimental stage. **Ask for our Free No. 78 Bargain Bulletin.**

ADDRESS

"Rebuilt" Equipment Department

Premier Electric Company

Chicago, Ill.

"REBUILT" when connected with PREMIER means something.

RECONSTRUCTED EQUIPMENT

Gray single slot 5c desk or wall type paystations @	$ 1.25
Kellogg No. 10 ½ M. F. Condensers @	.30
Federal Tel. Long Distance or Century 5-bar Bdg. Hand Generators complete with cranks and mounting screws @	2.00
Chicago Telephone Supply 4-bar 1600 ohm Bdg. compacts with Kellogg Transmitters @	6.75
Am. Elec. No. 360 Pony type 5-bar 1600 ohm Bdg. compacts with Kellogg Transmitters @	8.75
Stromberg Carlson No. 104 type 5-bar 1600 ohm Bdg. compacts @	9.25
New Cabinet Inside connection (Short pony type) compacts with either Kellogg or Western Elec. Transmitters, 3-bar 1000-1600 or 2500 ohm Bdg. @ $9.00—4-bar @ $10.00—5-bar @	11.00
Western Elec. No. 317 inside connection 3-bar 1000-1600 or 2500 ohm Bdg. compacts @ $8.75—4-bar with S. C. Gen. @ $9.25—5-bar @	10.00
Dean Elec. No. 240 4-bar 1600 ohm Bdg. compacts with Kellogg transmitters @	7.00

Write for Bulletins

REBUILT ELECTRIC EQUIPMENT CO.
1940 West 21st Str., Pilsen Station Chicago, Ill.

HAVE YOU ANY OLD TELEPHONE EQUIPMENT TO BUY OR SELL?

Then try the "Opportunities" page in TELEPHONY for it will give you quick and pleasing results, as the following letter from the Manteca Telephone Co., Manteca, Calif., testifies:

"Enclosed please find check in payment of invoice for classified advertisement. Had fine results from the advertisement as is usual in good old TELEPHONY."

We receive many similar letters every day.

WHY DON'T YOU GIVE IT A TRIAL?

TELEPHONES repaired and exchanged. New and slightly used equipment for sale. Telephone properties listed for sale. Send for Price List and sample mouth-pieces.

TELEPHONE REPAIR SHOP
1760 Lunt Ave., Chicago, Ill.

POSITIONS WANTED

CABLE SPLICER with a general knowledge of all kinds of telephone maintenance work. Will accept full or part time job; prefers full time. Good references. M. Stalker, Route No. 3, Box No. 390, Terre Haute, Indiana.

POSITION WANTED—By first class cable splicer. Also experienced in outside plant construction; good reference given. Address 7890, care of TELEPHONY.

FOR SALE

ATTENTION—Guaranteed perfect receiver cords, eleven cents; Desk stand, twenty-five cents. Lowest prices any type. H. Banks, Framingham, Mass.

FOR SALE—Addressograph, Model F 1, motor operated and hand operated Graphotype and 400 plate frames. In excellent condition, $100.00. Ohio Associated Telephone Company, Bryan, Ohio.

American Electric Co. EQUIPMENT

No. 45 Burns Express combined drops and jacks	$1.00
Drop coils only	.50
No. 400 keys (4 party selective)	1.50
No. 211 keys (individual selective)	1.50
No. 50 standard transmitters	.75
No. 60 receivers (new shell and cap)	1.00
No. 53 knuckle joint transmitter arms	.15
No. 5-C, 31-B, 31-D and 32-D induction coils	.35
No. 76 ringers, 1000 or 1600 ohm	.75
No. 87 or Hercules type generators	2.50

Buckeye Telephone & Supply Company
1432 So. Parsons Ave.
COLUMBUS, OHIO

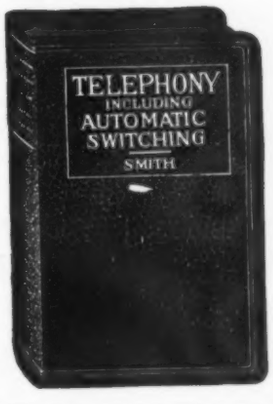
REWINDING Generator Armatures, $1.50 each, lots of 6 or more $1.25. Ringer Coils, 1000 ohm, $1.00 per pair—1600 ohm, $1.15—2000 ohm $1.25—2500 ohm, $1.35. 10% discount on lots of 6 pair or more. New wire and insulation. Goods returned postpaid.

SCOTT COIL & TRANSFORMER CO.
Myrtle, Mississippi.

FOR SALE—35 Western Electric No. 1051AL dial type desk stands complete less dials at $4.00 each. CORWIN ELECTRIC CO., Indianapolis, Ind.

FOR SALE—One W. E. cross connecting rack, with No. 7A, 7 amp. fuses for 400 pr. cable. Heat coils and carbons for 240 drops, in first class working order. Price reasonable. C. W. Shaffer, Wire Chief, Ogden Iowa.

FOR SALE—No. 17 gauge parallel drop wire, in 1000 ft. coils. All new, fresh stock, $7.00 per 1000 ft. Also new Bakelite mouthpieces for W. E. transmitters, 5c each. Also new 3 conductor 5 ft. 6 in. brown desk stand cords, 20c each; 8 ft. 30c. Wm. M. Miller & Sons, 2553 Madison St., Chicago, Ill.



If a man is to succeed in the business world today he must be "worthy of his hire."

So it is with books. They also must give the reader his money's worth.

In offering "Telephony, Including Automatic Switching," for sale, its publishers have arranged an excellent collection of helpful information and data fully illustrated and up-to-date for the telephone man.

TELEPHONY, including AUTOMATIC SWITCHING, is written by Arthur Bessey Smith, E. E. Automatic switching is certainly being rapidly adopted, and the construction of every switch, relay and contractor in the whole range of automatic devices is clearly presentable.

Pocket size, bound in Leatherette, Gold Stamping, 500 pages, 268 illustrations and Wiring Diagrams. Price $2.50.

TELEPHONY PUBLISHING CORP
608 So. Dearborn St., Chicago
Telephone—Wabash 8604

J. K. JOHNSTON TELEPHONE JK ENGINEER
During recent years I have been privileged to appraise Telephone Exchanges all over the United States. The list totals 750. Would you like to avail yourself of my services?
1035-6 Lemcke Building

Frank F. Fowle & Co.
Electrical and Mechanical ENGINEERS
221 North La Salle St. CHICAGO

CONSULTING Telephone Engineer
GARRISON BABCOCK
Tel. E. L. 3149 503 White Building
SEATTLE, WASHINGTON

SPOONER & MERRILL, Inc.
CONSULTING ENGINEERS
Specialists in Public Utilities
TELEPHONE - ELECTRIC - GAS
WATER - RAILWAY
Valuation—Examinations—Engineering
CHICAGO, ILLINOIS
20 No. Wacker Drive

Consulting Telephone Engineers
W. C. POLK — J. W. WOPAT
Plans, Estimates and Reports,
Appraisals and Supervision
101 West 11th St. Kansas City, Mo.

W. H. CRUMB
Telephone Engineer
9 South Clinton St. Chicago

AVOID "LOST" CABLES—
Use Our
Pressure Testing Equipment!
Also
Extension Poles and Mountings
For Exploring Coils
DETROIT INSTRUMENT SERVICE
14586 ILENE AVE. DETROIT, MICH.

J. G. WRAY & CO.
Telephone Engineers
Specialists in Appraisals, Rate Surveys, Financial Investigations, Organization, and Operation of Telephone Companies.
J. G. Wray, Fellow A. I. E. E.
Cyrus G. Hill
2130 Bankers Bldg., Chicago

Co. for a new telephone system to be installed at its local exchange.

BOSTON, MASS.—At its regular monthly appropriation meeting on December 16 the executive committee of the New England Telephone & Telegraph Co. authorized the expenditure of $1,430,609 for new construction and improvements in plant necessary to meet the demand for service.

For Maine the appropriations aggregate $199,172; New Hampshire, $54,002; Vermont, $35,955; Massachusetts, $966,920; Rhode Island, $174,560.

Of the amount authorized, $123,343 were appropriated for exchange lines, $138,008 for station equipment, $117,660 for toll lines, $44,610 for central office equipment, and $1,006,988 to cover the total cost of hundreds of routine additions to plant in the company's territory during January.

Miscellaneous.

BLOOMINGTON, ILL.—Fred N. Beckman, who for many years was manager of the old Central Union Telephone Co. at Bloomington, died Monday, November 24. Mr. Beckman was one of the first men in the telephone business in Illinois. During the past several years he has been employed by the Kinloch-Bloomington Telephone Co.

GENESEO, ILL.—Arthur E. Peterson, former manager of the Geneseo Telephone Co. who has been ill since a nervous breakdown suffered several years ago, died recently at the age of 57 years. He was born in Atkinson township and educated in rural schools.

SEATON, ILL.—F. E. Dameron, manager of the Seaton and Little York telephone exchanges, has been ill in Burlington, Iowa, suffering an infection in his right knee. The infection was caused when a telephone pole struck his knee some weeks ago.

AMHERST, IOWA.—At a recent meeting of the owners of the Amherst Telephone Co. and officers of the West Iowa Telephone Co., plans were discussed regarding the possible sale of the Amherst company to the West Iowa Telephone Co.

Since a number of farmers in Amherst have been applying for service from the Marcus exchange, it was decided that the local company was in a better position to take care of the business and to make such extensions as will be needed, and the Amherst company agreed to sell.

CRESTON, IOWA.—John H. Sullivan has been elected president of the Creston Mutual Telephone Co. to fill the vacancy caused by the death of his father, J. C. Sullivan. Frank Smith was elected to fill the vacancy on the board of directors.

HITCHCOCK, S. D.—The Western Farmers Telephone Co. has moved into its new modern brick building, the move being made without interruption of service.

With new equipment throughout, the Hitchcock plant is one that compares favorably with any other in the state.

THEODORE GARY AND COMPANY
KANSAS CITY, MISSOURI
Ninetieth Consecutive Quarterly Dividend
The regular quarterly dividend for quarter ending December 31, 1930 of 40c per share on the No Par Preferred Stock has been declared payable January 1, 1931 to stockholders of record as of the 15th day of December, 1930 at 3 P. M. The usual dividend on the Common Stock has been declared payable January 1, 1931 to stockholders of record as of the 31st day of December, 1930.
(Signed) C. A. BENNETT,
Senior Vice-Pres. and Treas.
December 10, 1930

Telephone Directory & Advertising Company
A Telephone Directory Advertising Sales Organization
Wichita, Kan. 816 Brown Bldg. Main Office Telephone Bldg., Kansas City, Mo. Chicago 100 W. Monroe

ACCOUNTING
HERDRICH AND BOGGS
Certified Public Accountants
Specializing on Public Utilities
901-7 Continental Bank Bldg.
Indianapolis, Indiana

Universal Insulators
will support your drop wires to your entire satisfaction and at a minimum cost. Are you a user? Samples free on request.
Universal Specialty Co.
711 Poplar Street
Terre Haute, Ind.

Creosoted
CEDAR POLES
Prompt Shipment via Rail or Water
CASCADE TIMBER CO.
822 Tacoma Building Tacoma, Wash.

We will sell your
Telephone Directory
ADVERTISING
or will publish your directory complete
L. M. BERRY & CO. DAYTON, OHIO

NILCO
SWITCHBOARD LAMPS
NILCO LAMP WORKS, INC., Emporium, Pennsylvania

Directories Are Profitable
We furnish books and pay cash bonus or percentage. Mutual and rural companies specialties. References galore. Get our proposition first.
HOOSIER DIRECTORY CO.
Box 393 GOSHEN, IND.

NAUGLE POLES
Northern and Western Cedar
Butt-treated or Plain
NAUGLE POLE & TIE CO.
59 East Madison St., Chicago

DEC 26 1930

Telephony

THE AMERICAN TELEPHONE JOURNAL

TELEPHONY PUBLISHING CORP.,
608 So. DEARBORN ST., CHICAGO, ILL.
TELEPHONE WABASH 8604

December 27, 1930 *Vol. 99. No. 26*
Entered as second-class matter Sept. 4, 1903, at the Post Office at Chicago, Ill., under act of March 3, 1879.

PUBLISHED EVERY WEEK
SUBSCRIPTION $3.00 A YEAR

W. H. BUCKINGHAM · STEPHENS · BINGHAMTON, N.Y.

STEPHENS CLIMBERS

Linemen prefer them above all others.

We also manufacture Climber Straps and Pads, Safety Straps and the Easy Tool Belts.

Send for circulars.

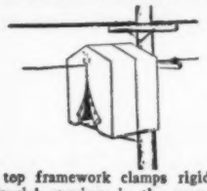
W. H. BUCKINGHAM
BINGHAMTON, N. Y.

Everstick's New Anchor

A Three-way has no equal—easily expanded—the best anchor value. Order for trial—now. Low in price. Send for Bulletin.

EVERSTICK ANCHOR COMPANY
St. Louis, Missouri

AERIAL CABLE SPLICER TENTS



Metal top framework clamps rigidly to the cable. Special openings in the canvas at each end permits the cable to come through.

Miner Tents—Tarps for all uses.

Used by leading telegraph and telephone companies for years.

Send for descriptive literature and prices.

UNITED STATES TENT & AWNING CO.
711 N. Sangamon St. Chicago, Ill.

Telephone Cables

ALL SIZES AND CAPACITIES

Hard Drawn Copper Telephone Wire

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

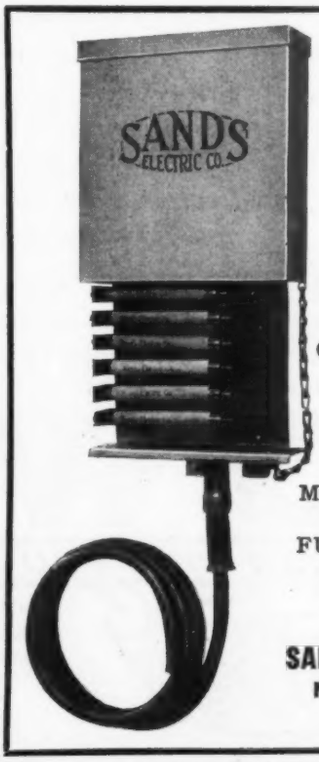
CHICAGO—20 North Wacker Drive
CINCINNATI—Traction Building
NEW YORK—100 East 42nd St.

The Ring with the Tension Grip

A MERRY CHRISTMAS

The Season's greetings to all our friends in the Industry—We sincerely trust that your Christmas was a very happy one and that the New Year will be most prosperous.

THE NATIONAL TELEPHONE SUPPLY COMPANY
5100 Superior Ave., Cleveland, Ohio
Canadian Manufacturer
N. SLATER CO., Ltd., Hamilton, Ont.



SANDS ELECTRIC CO.

No. 40

REVERSIBLE PROTECTED TERMINAL WITH CAST IRON CORE BOX AND SLIDING ZINC COVER

MADE IN 3 AND 5 PAIRS AND FURNISHED WITH OR WITHOUT CABLE STUB

SANDS ELECTRIC CO.
NORTH CHICAGO
ILLINOIS

American Steel & Wire Company

Perfected TELEGRAPH TELEPHONE Wire
Perfected Strand

We announce the perfection of our new process of tight zinc coating that is smooth, deeply laid and naturally flexible as the wire.

Produced in our old reliable standard brands "Extra BB," "BB" and "Steel"

Sales offices: Chicago—New York

dependable
CEDAR POLES
offering utmost in quality and value

Poles With Character

MICHIGAN POLE & TIE CO.
NEWBERRY, MICH.
Sales—Grand Rapids, Mich.

FORT WAYNE PRINTING COMPANY
FORT WAYNE, IND.

Printers and Blank Book Manufacturers

Write for Samples and Prices on I. C. C. Forms

Ours Are the Best

Northern or Western

CEDAR POLES

Plain or Treated

Prompt Shipment from Large, Carefully Sorted Stocks

MacGillis & Gibbs Co.
Milwaukee, Wisconsin

DIRECT SHIPPING ROUTES for BROWN TREATED POLES

WHEN you buy Brown treated poles of Southern Yellow Pine, you get them on time.

Storage Yards and Treating Plants at Brownville, Ala., and Louisville, Ky., ideal locations for quick deliveries of poles because of splendid rail routes diverging North, East, South and West.

And our traffic department maintains a service throughout the transit of your order which enables us to tell you where your poles are at any time.

We frankly prefer to make contract deliveries over an extended period, but if you have an emergency put it up to us.

BROWN WOOD PRESERVING COMPANY

(Formerly Creosoting Department W. P. Brown & Sons Lumber Co., Inc.)

4th and K Streets, Louisville, Kentucky

Long Distance Telephone: Magnolia 2407

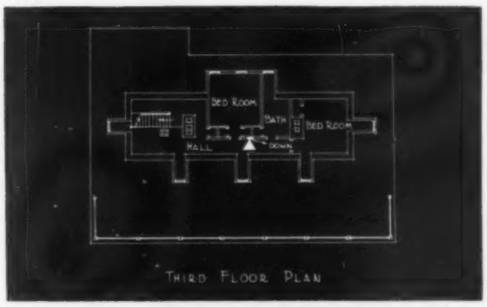
BROWN

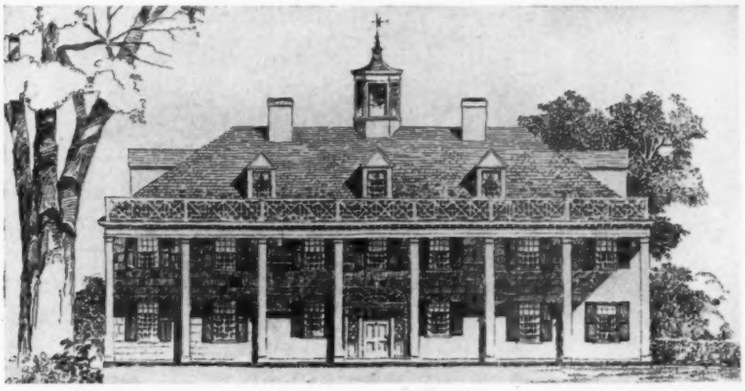
CREOSOTED YELLOW PINE PRODUCTS

300,000 Acres One of the largest

Individual Holdings in America

"Just as we Plan other Modern living Comforts, we provide for Telephone Service"





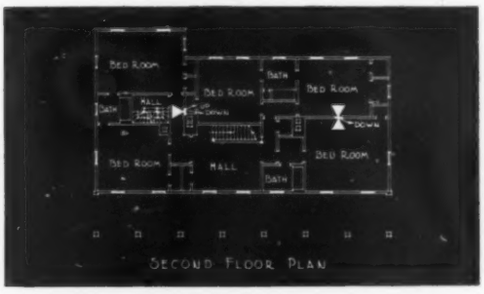
LEGEND
TELEPHONE OUTLET
CONDUIT
PROTECTOR CABINET

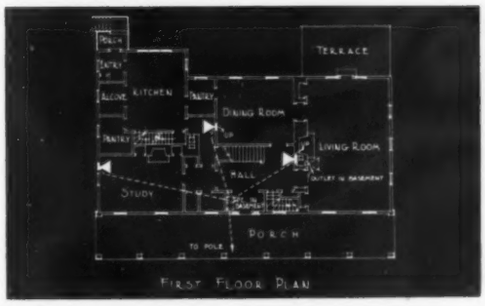
In the residence, "Mt. Vernon," Norwood Road, West Hartford, Connecticut, built-in conduit serves eight telephone outlets, including one in the recreation room in the basement. PHILIP B. WHITE, Builder, *West Hartford.* WALTER P. CRABTREE, JR., Architect, *Hartford.*

IN CONSTRUCTING homes for sale, builders find it profitable to include inexpensive features which they know will appeal strongly to home buyers. Outstanding among these is provision for *telephone convenience*. A New England builder says:

"I believe in providing built-in conduit for a complete telephone installation. Just as we plan other modern living comforts in every room, we provide for telephone service wherever it will increase the convenience of those who live in the house."

Builders may consult freely with representatives of the local telephone company in planning the telephone arrangements for new and remodeled buildings. No charge is made for this advisory service. Just call the Business Office.





The advisability of considering complete telephone convenience together with other living comforts in building the modern home is emphasized in this advertisement, appearing this month in a group of magazines edited for builders.

Superb

THE giant passenger locomotive must be capable not only of pulling the train at high speed on level stretches, but also must have the reserve power to maintain its speed up hills.

This is what the Stromberg-Carlson Super-Service Switchboard does for the telephone industry.

Every operation that can be performed economically and efficiently by mechanical means is incorporated as a feature of this switchboard. This leaves the operator, unhampered by a multiplicity of manual duties, free to render prompt and accurate service even under the strain of peak loads.

One of the features that is of particular assistance to the operator is the simplified keyboard which entirely eliminates "key hunting." There is only one key, common to all cord circuits, for each ringing frequency.

A request to your nearest Stromberg-Carlson office will bring you convincing evidence that the Stromberg-Carlson Super-Service Switchboard is the most economical and efficient telephone switching equipment on the market.

Write for Bulletin 112

Stromberg-Carlson Telephone Mfg. Co.

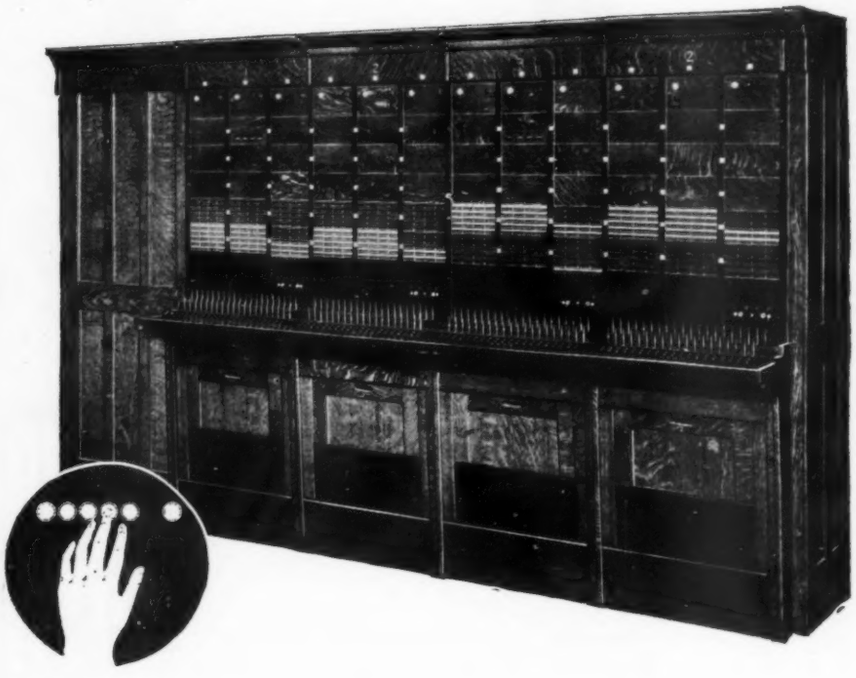
Factory and General Offices:
100 CARLSON ROAD, ROCHESTER, N.Y., U.S.A.
Branch Offices: KANSAS CITY, MISSOURI
CHICAGO, ILLINOIS TORONTO, CANADA

Pacific Coast Representative—Garnett, Young & Co., San Francisco, Cal., Los Angeles, Cal., Portland, Ore., Seattle, Wash.

Southern Representative—Scoville Mercantile Company, Atlanta, Ga.

Stromberg-

reserve ability



Features of the Stromberg-Carlson Super-Service Switchboard:

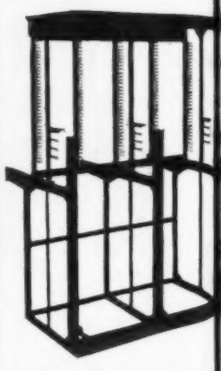
Advance Plugging-In
Operator's Listening Indication
Operator's Secret Service
Audible Busy Test
Reverting Busy Test with Tone
Operator's Ringing Control
Instantaneous Ringing Start
Instantaneous Ringing Cut-Off
Calling Subscribers' Ringing Control
Visual Ringing Indication
Reverting Call Ringing
Positive Supervision
Non-ring Signalling
Emergency Ringing
Flash Recall
Call Registration
Operator's Cut-In
Ringing Tone
Machine Ringing
Operator's Bar
Dark Keyboard

"There Is Nothing Finer Than a Stromberg-Carlson"

Carlson

THERE IS ONLY *One*

SPACE
BEAUTY
ECONOMY
RIGIDITY
STRENGTH
SIMPLICITY
DURABILITY
FLEXIBILITY
COMPACTNESS
ACCESSIBILITY



Rigid Steel Frame—Continuous and Interlocking

Positional units—factory wired complete and interchangeable

Kellogg *Switchboard*

CHICAGO

COLUMBUS KANSAS CITY

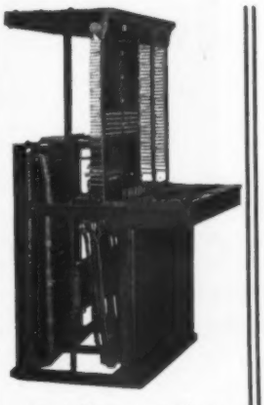
Masterbuilt . . . . !

HE Masterbuilt line of switchboards is wholly new and exclusive. It is exclusive even to comparison—for its outstandingly original design—for unusual construction features—and for its almost unbelievable flexibility. se engineering principles are so far advanced that there is nothing to ad today that even approaches it.

ause Masterbuilt switchboards are available in capacities to fit any size hange, their popularity is universal.

fast as possible, telephone companies are being informed as to the meaning of the word "Masterbuilt". Its meaning, being so tremens, has nothing with which it can be compared. For the telephone comy, Masterbuilt is setting new and better standards in economical tral office investment and operation.

sure that a Kellogg representative discusses with you this far-reaching elopment, and points out—clearly and concisely—every phase of the sterbuilt principle. Today, Masterbuilt is the equipment that stands e in the field for maximum earnings, low cost, and minimum installa- charges. Investigate to the fullest extent, a Masterbuilt switchboard fits *your* requirements! *Remember*. . . there is only *one* Masterbuilt , the *only* equipment that gives you *all* of those features which you e so long hoped for!



Assembly — convenient and accessible

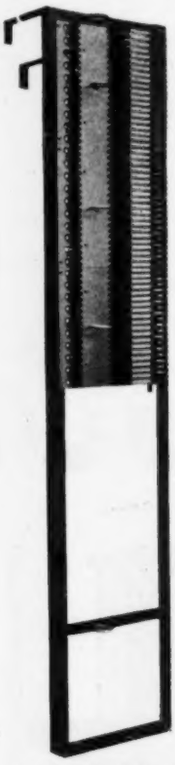
Complete Masterbuilt board—low cost, minimum installation . . . Flexibility

rnd Supply Company

AINOIS

TY AN FRANCISCO SHANGHAI

Cook L-10 Main Distributing Frame and H-51 Protectors



A steel floor type frame consisting of two vertical upright angle iron supports with cross pieces and brackets. Additions can be made to left or right.

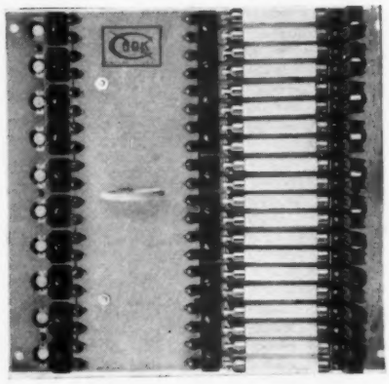
H-51 Protector, in 10 pair sections, is a combination of line terminals, fuses, and open space cut outs mounted on a steel panel with aluminum finish.

All contact springs are of bronze.

Screw and washer and solder contact for jumper wires.

Current carrying parts are insulated with hard rubber.

Fuses are of composition 1 ampere capacity.



The H-51 is a neat, compact, fireproof protector, easily maintained.

Manufactured by

COOK ELECTRIC COMPANY, 2700 Southport Avenue, Chicago

LEICH
No. 13-A Repeating Coil

The No. 13-A Repeating Coil is a talk through type recommended for cord, trunk and other circuits.

Designed for satisfactory operation in all cases requiring a repeating coil of the talk through type.

Mounts on steel bars uniformly with Leich relays or on individual mounting angles.

Further information on request.

LEICH ELECTRIC CO.
Genoa, Ill.

Crapo
GALVANIZED PRODUCTS

Telephone and Telegraph Wire
Extra Best Best (EBB)
Best Best (BB)
Steel

Seven Wire Steel Strand
Standard
Siemens-Martin
High Strength
Extra High Strength

Crapo Galvanized Products combine *every* element essential to long life and low maintenance cost: pure zinc coatings, *non-cracking, non-peeling*—correct tensile values—proper ductility.

Immediate shipping service from Distributors' stocks in all jobbing centers.

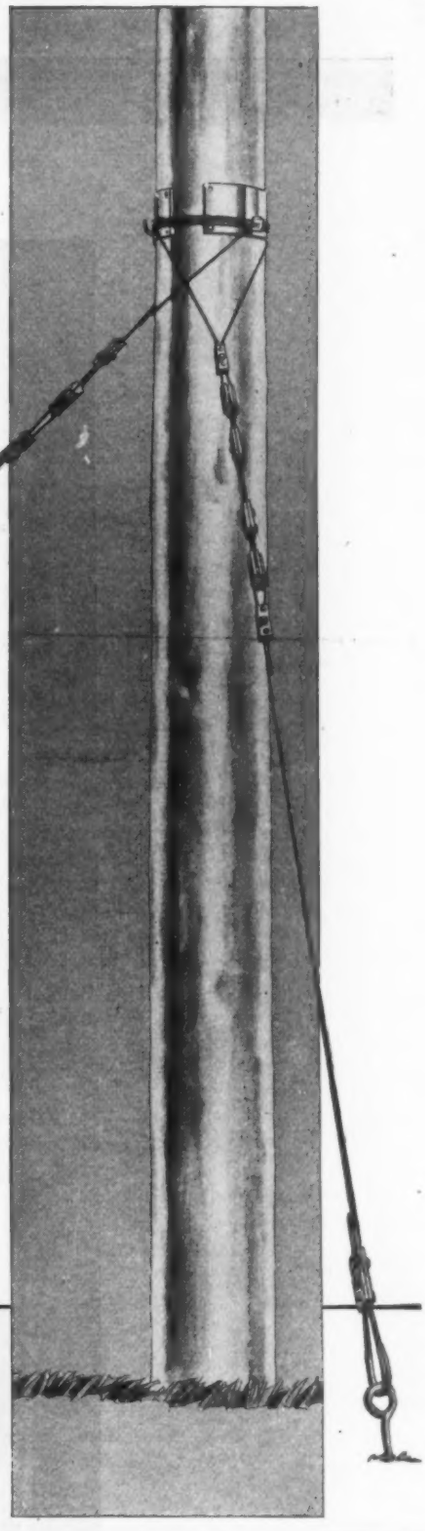
Manufactured Exclusively by
Indiana Steel & Wire Co.
Muncie, Indiana

You can anchor with confidence to

GENERAL ELECTRIC POLE LINE HARDWARE

and

Construction Specialties



When you install G-E Pole Line Hardware on *your* lines you are anchoring to General Electric dependability—for years and years.

Dependability marks the whole G-E line from rugged guy rods to insulator pins because every metal part is best-grade, open hearth steel, *double-dipped hot galvanized* on surfaces carefully cleaned to prevent scale.

Design is correct—perfected by long manufacturing experience and complete familiarity with best line practice in *your* field.

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AND SEE THE G-E LINE!

Section C-9712, Merchandise Department
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Please send me

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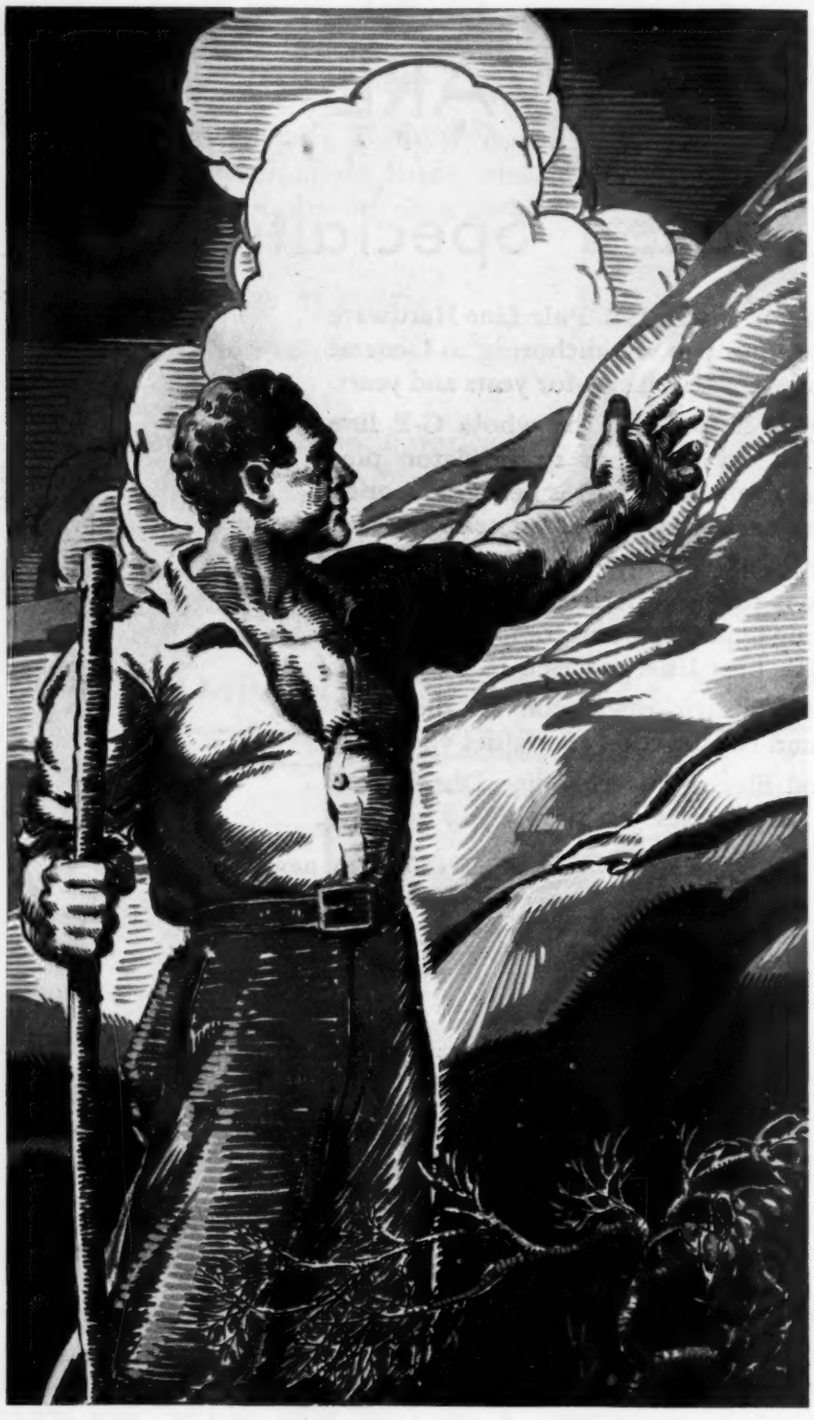
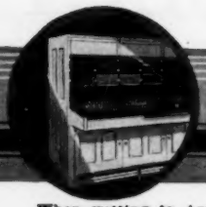
Pole Line Hardware

MERCHANDISE DEPARTMENT • GENERAL ELECTRIC COMPANY • BRIDGEPORT, CONNECTICUT





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hone Pioneering

rdinary consistent growth of the telephone business is accu-ected in the character of the men actively identified with it. nted in the minds of these men is the vital necessity for d improvement in equipment and methods to keep step with made upon telephony today—and to be ready for the demands ade upon telephony tomorrow. It would be difficult to find men—in any line of endeavor—as receptive to new ideas, new d new experience as are telephone men. Their adaptability to their eagerness to pioneer have undoubtedly been major factors phony the splendid success that it is today.

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High in Conductivity, Uniform in Quality and Easy to String.

Look for the seal—it's your guarantee of Quality.

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ADVERTISERS' INDEX

A

A 3—Acorn Insulated Wire Co. —
A 1—Addressograph Co. ..... —
A14—Alton Battery Co. ..... —
A 2—American Creosoting Co. ..... —
A10—American Cross Arm & Conduit Co. ..... —
A 4—American Electric Co. Inc. 10-11
A 5—American Electrical Works 1
A 7—American Steel & Wire Co. 1
A 6—American Telephone & Telegraph Co. 3
A 8—Associated Telephone & Telegraph Co. ..... —
A 9—Automatic Electric Co., Inc. 26-27
A12—Automatic Telephone Mfg. Co. 25
A11—Ayer & Lord Tie Co. ..... —

B

B 1—Babcock, Garrison 46
B12—Bartlett Tree Expert. F. A. ..... —
B 7—Berry Co., L. M. 46
B 8—Bernz Co., Inc., Otto... 47
B 9—Blake Signal & Mfg. Co. 47
B10—Block & Co., Lynton T.. —
B 2—Bond Electric Co. ..... —
B 4—Bright Star Battery Co. —
B 6—British Insulated Cables, Ltd. ..... —
B 3—Brown Wood Preserving Co. 2
B15—Buckeye Tel. Supply Co. 45
B 5—Buckingham, W. H. 1
B16—Bunnell & Co., Inc., J. H. 43
B14—Burgess Battery Co. .... —
B17—Burroughs Adding Mach. Co. ..... —

C

C 1—Calculagraph Co. ..... —
C15—Carbon Products Co. ..... —
C 5—Cascade Timber Co. 46
C 7—Chance Co. 47
C 2—Churchill Cabinet Co. 43
C 6—Clay Products Co., Inc.. —
C 3—Coffing Hoist Co. ..... —
C 8—Cook Electric Co. 8
C12—Crescent Tool Co. ..... —
C10—Crumb, W. H. 46
C13—Curtin-Howe Corp. ..... —

D

D 1—Davey Tree Expert Co., Inc. ..... —
D 3—Detroit Instrument Service 46
D 8—Do-More Chair Co. 41

E

E 3—Electric Storage Battery Co. ..... —
E 5—L. M. Ericsson Telephone Co. 49
E 4—Everstick Anchor Co.... 1

F

F 1—Fansteel Products Co., Inc. ..... —
F 3—Fort Wayne Ptg. Co. ... 1
F 2—Four Wheel Drive Auto Co., The ..... —
F 4—Fowle, Frank F. 46
F 5—Frankel Connector Co.... —
F 6—French Battery Co. 44

G

G 3—Gary Co., Theodore..... 46
G 1—General Dry Batteries, Inc. 43
G 5—General Electric Co. 9
G 6—Gulfport Creosoting Co.. 39

H

H 2—Hemingray Glass Co.... —
H 6—Herdrich & Boggs..... 46
H 7—Holtzer-Cabot Elec. Co.. 39
H 8—Hoosier Directory Co.... 46

I

I 1—Indiana Steel & Wire Co. 8
I 3—International Creosoting & Construction Co.... 50
I 4—International Harvester Co. ..... —

J

J 3—Johnston, J. K. 46
J 4—Joyce-Watkins Co. 1

K

K 4—Kearney, Jas. R. ..... —
K 1—Kellogg Switchboard & Supply Co. 6-7
K 2—Kent, Grace & Co. ..... —
K 5—Kester Solder Co. ..... —
K 3—Klein & Sons, Mathias.. —

L

L 2—Lanz Bolt Co., M. 47
L 3—Leich Electric Co. 8
L 4—Littleford Brothers ..... —
L 1—Long-Bell Lumber Co... —

Mc

M 5—MacGillis & Gibbs Co... 1
M 8—McGraw-Hill Book Co. Inc. ..... —

M

M 3—Martin-Decker Corp. ... —
M 4—Martin & Son Pro. Co., Inc. ..... —
M 6—Matthews Corp., W. N. —
M 1—Michigan Pole & Tie Co. 1
M 2—Minnesota Electric Co... —

N

N10—National Cable Compound Co. 47
N 3—National Fire Proofing Co. ..... —
N 5—National Telephone Supply Co. 1
N 7—National Telephone & Telegraph Co. ..... —
N 6—Naugle Pole & Tie Co.. 46
N 8—Nilco Lamp Works, Inc. 46
N 2—North Electric Co. ..... —
N 9—Northern White Cedar Association ..... —

O

O 1—Oliver Iron & Steel Corp. ..... —

P

P 1—Page & Hill Co. ..... —
P 2—Paragon Electric Co. 12
P 3—Partridge Lumber Co.... —
P 9—Philadelphia Storage Battery Co. ..... —
P11—Phillips Elec. Wks., Ltd., Eugene F. 39
P 5—Polk, W. C. 46
P10—Porter, Inc., H. K. ..... —
P 6—Premier Electric Co.... 45

R

R 1—Rebuilt Elec. Eqpt. Co.. 45
R 2—Reliable Electric Co.... 12
R 4—Republic Appraisal Co.. —
R 3—Roebling's Sons Co., J. A. 12
R 5—Runzel-Lens Elec. Mfg. Co. ..... —

S

S 2—Sands Electric Co. 1
S 6—Siemens Bros. & Co., Ltd. ..... —
S 5—Southern Wood Preserving Co. ..... —
S 7—Spooner & Merrill, Inc... 46
S 8—Stewart Bros. 47
S 9—Stromberg-Carlson Telo. Mfg. 4-5
S10—Suttle Equipment Co.... 41

T

T 8—Telephone Bond & Share —
T 7—Telephone Directory & Advertising Co. 46
T 8—Telephone Securities Co.. 12
T 4—Teletype Corp. ..... —
T 3—Telkor, Inc. 41
T 2—Templeton, Kenly & Co., The ..... —
T 6—Texas Creosoting Co.... —
T 1—Thompson Co., G. W... —
T 2—Trackson Company ..... —

U

U 2—U. S. Tent & Awning Co. 1
U 1—Universal Specialty Co.. 46
U 4—United Trust Co. ..... —

W

W 4—Wall Mfg. Supply Co., P. ..... —
W 9—Waterbury Battery Co.. —
W 3—Western Electric Co.... —
W 1—Weston Electl. Inst. Corp. ..... —
W 7—White, O. C. ..... —
W 8—Whitney Blake Co. ..... —
W 2—Wray & Co., J. G. 46
W 6—Wyckoff Pipe & Creosoting Co. 44

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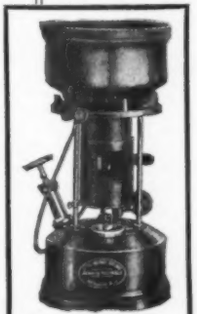

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1 Gallon
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These furnaces and torches are ideally suited for telephone workers and lineman's jobs. That is why most telephone men use "ALWAYS RELIABLE".

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Blake Insulated Staples
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Unequalled for telephone and bell wiring. The fibre insulation prevents troublesome short circuits and grounds.

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EFFECTIVE *in maintaining your underground and aerial cable in perfect condition*

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B17.
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A1.
Ammeters
W1.
Anchors
C7, E4, K4, M6.
Appraisers
P5, U4, W2.
Arms and Brackets (for Holding Telephones)
A4, K1.
Arresters, Lightning (See Protective Devices)
Auditing and Accounting Systems
H6, S10.
Automatic Telephones
A9, A13, E5, K1, N2, S6.
Battery Charging Equipment
F1, G5.
Batteries, Dry
B2, B4, C9, F6, G1, W9.
Batteries, Dry, Radio "A," "B" and "C"
B2, B4, C9, F6, G1, N1.
Batteries, Flashlight
B2, B14, C9, F6, G1.
Batteries, Primary
W9.
Batteries, Storage
A14, E3, P9.
Bells, Magneto
A4, H7, K1, N2, S4, S10.
Belts and Safety Straps (Linemen's)
B5, K3.
Blank Books (etc.)
F3.
Books, Telephone
M8.
Booths, Telephone
B16.
Cable
A5, B6, E5, K1, P11, R3
Cable Compound
A7, N10, R2, R3, S10.
Cable Grips
M4.
Cable Rings
E4, N5.
Cable Splicing Joints
M6.
Cable Terminals
C8, R2, S2.
Clamps, Ground (Plates, Cones)
L2, P2.
Clamps, Guy
A7, C8, E4, L2, M6, N5, R3.
Climbers
B5, C12, K3.
Clips, Cable
A4, L2, M6.
Clips, Testing
F5.
Condensers
A4, A9, K1, L2, S9, W3.
Conduit, Clay
C6, K6, N3.
Conduit, Treated
A11, C13, W6.
Connectors, Test
C8, R2, S8.
Cords, Telephone and Switchboard
A4, A9, K1, R5, S9.
Cross Arms
A4, A10, A11, K1, W6.
Directory Publishing and Advertising Service
B7, T7.
Earth Boring Machines
F2.
Extension, Relays
K1, S4.
Engineers, Telephone
B1, C10, F4, J3, P5, R4, S7, U4, W7.
Financial Service
A3, K2, P5, R4, T1, T3, U4.
Fire Pots and Furnaces
W4.
Furnaces, Lead Melting
B3, L4.
Furnaces, Compound
L4.
Fuses, Mica
A4, C3, R3.
Generators, Ringing
H,7 K1, L3.
Generators, Motor
H7.
Hangers, Cable
C8, E4, K1, L2, N5, R2, S2.
Hoist and Guy Clamps
C3.
Induction Coils
A4, A5, K1, L3, M6, S2.
Instruments, Electrical Measuring
W1.
Insulators
H2, P2, U1.
Insurance, Fire and Employers' Liability
B10.
Intercommunicating Systems
A4, K1, S9.
Jacks, Pole
T2, W3.
Keys, Switchboard
A4, K1, L3, S9.
Lighting, Industrial
W7.
Meters (Electrical Testing and Measuring)
H7, S8, W1.
Pliers
C12, K3.
Pole Erectors
F2.
Pole Line Hardware
A4, K1, L2, N5, O1, S10, W3.
Pole Pullers
H3, T2.
Pole Markers
P8.
Pole Straighteners
T2.
Pole Steps
L3.
Poles, Treated or Plain
A2, A11, B3, C5, G6, I3, J4, L1, M1, N3, N6, P1, P3, S5, T6, W6.
Printed Telephone Forms
F8, S10.
Protective Devices
C8, M3, R2, S2.
Radio Supplies
K1, S9.
Rebuilt Telephone Apparatus
B15, P6, R1, S10.
Rectifiers
F1, G5,
Relays, Loud Ringing, Calling Systems, Signals
K1, N2, S4.
Reels, Pay-out and Takeup
M6.
Remote Control Systems
N2.
Ringing Machines
H7, L3, T3.
Rods, Ground
P11.
Sleeves, Wire
C8, N5, R2, R3.
Soldering Supplies
K5.
Staples, Insulated
B9.
Switchboard, Lamps
N8.
Switchboards, Telephone
A4, A9, A13, E5, K1, L3, N2, S6, S9, S10, W3.
Tanks, Portable
P7.
Tape (Splicing)
S9.
Telephones
A4, A9, A13, E5, K1, L3, N2, S6, S9, S10, W3.
Telephone Supplies (Jobbers)
A4, K1, S9.
Teletype
T4.
Telephone Typewriters
T4.
Tents, Aerial Splicer.
U2.
Testing Sets
A4, D2, M6, S8, W1.
Timing Devices
C1, E5.
Tool Boxes, Steel
L4.
Torches, Blow
B3, W4.
Transmitters
A4, A9, K1, L3, S9, W3.
Tree Surgeons
B12, D1
Trench Braces
T2.
Trench Rollers
T2.
Trucks, Motor
F2, I4.
Underground Specialties
N10.
Voltage Regulator, Automatic
M5.
Wire, Aeroplane
A4.
Wire, Copper
A3, A4, A5, A7, I1, K1, R2, P11, S9, S10.
Wire, Drop
G2.
Wire, Enameled and Magnete
A5, A7, K1, P11.
Wire, Galvanized Iron
A5, A7, I1, R3, P3, S10.
Wire Rope
A7, R3.
Wire, Rubber Covered
A7, H1, P11, W3.
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A3, A7.
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A5, P2.
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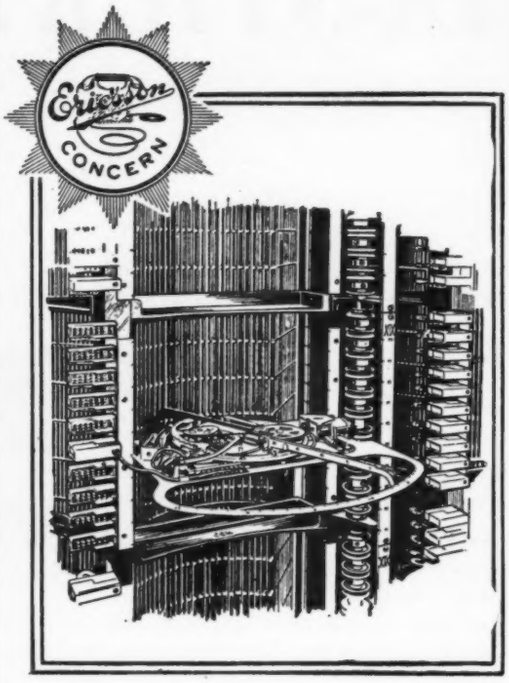

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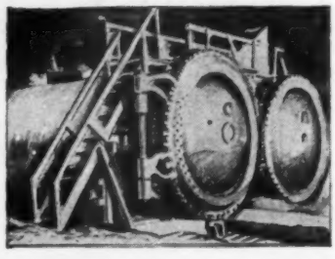
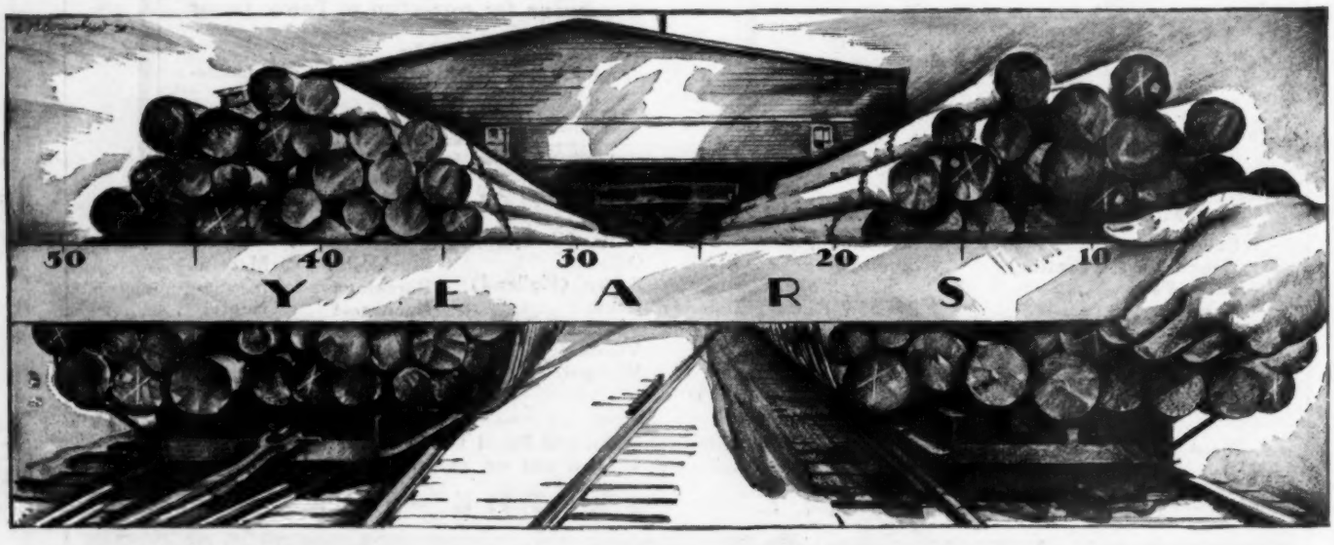
International Poles have an established life of from 35 to 40 years. Made of the strongest of pole woods, they offer greatest protection against damage. Free from decay, these poles are safer for linemen to climb. Hardware holds firmer.

And much more . . . including most important of all, the uniform high quality of product, integrity, and prompt performance associated for 50 years with the name, *International.*

Correct pressure . . the key to penetration



Every step in the application of preservative is carefully checked and re-checked. A complete system of modern indicating and recording gauges on the creosoting cylinders insures the right intensity and duration of pressure; and the right temperature. Thus the maximum penetration of the preservative is obtained. Experienced engineers supervise the whole process. Result — a protection from decay that has made International poles famous for their longer, stronger life.



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CREOSOTING & CONSTRUCTION CO.

PRODUCERS OF CREOSOTED YELLOW PINE POLES

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